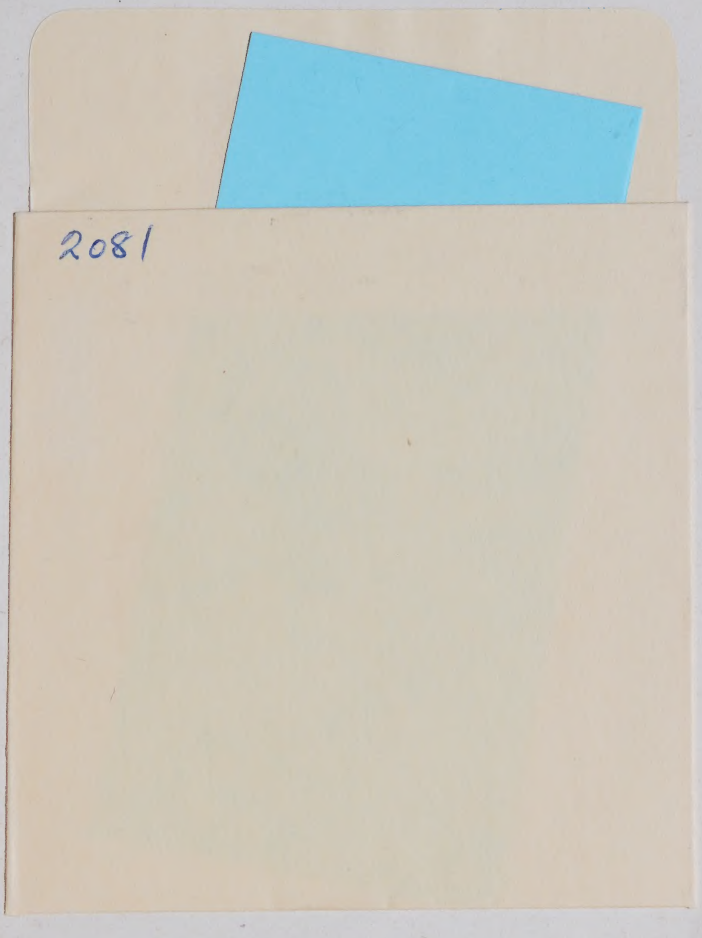
Tenth Annual Report and Wild Life Conference

31761 11555646 6

Commission of Conservation
Canada

SOUTHAM BUSINESS PUBLICATIONS LIMITED
LIBRARY



Commission of Conservation

Canada

SIR CLIFFORD SIFTON, K.C.M.G., Chairman
JAMES WHITE, Assistant to Chairman, Deputy Head

REPORT

OF

THE TENTH

ANNUAL MEETING

HELD AT OTTAWA

FEBRUARY 17

1919

OTTAWA: 1919

59873—1

Commission of Conservation

Constituted under "The Conservation Act," 8-9 Edward VII, Chap. 27, 1909, and Amending Acts 9-10 Edward VII, Chap. 42, 1910, and 3-4 George V, Chap. 12, 1913.

CHAIRMAN:

SIR CLIFFORD SIFTON, K.C.M.G.

MEMBERS:

DR. HOWARD MURRAY, Dean, Dalhousie University, Halifax, N.S.
DR. CECIL C. JONES, M.A., Ph.D., Chancellor, University of New Brunswick, Fredericton, N.B.
MR. WILLIAM B. SNOWBALL, Chatham, N.B.
HON. HENRI S. BÉLAND, M.D., M.P., St. Joseph-de-Beauce, Que.
DR. FRANK D. ADAMS, Dean, Faculty of Applied Science, McGill University, Montreal, Que.
MGR. CHARLES P. CHOQUETTE, M.A., St. Hyacinthe, Que., Professor, Seminary of St. Hyacinthe, and Member of Faculty, Laval University.
MR. EDWARD GOHIER, St. Laurent, Que.
MR. W. F. TYE, Past-President, Engineering Institute of Canada, Montreal, Que.
DR. JAMES W. ROBERTSON, C.M.G., Ottawa, Ont.
HON. SENATOR WILLIAM CAMERON EDWARDS, Ottawa, Ont.
MR. CHARLES A. McCOOL, Pembroke, Ont.
SIR EDMUND B. OSLER, M.P., Governor, University of Toronto, Toronto, Ont.
MR. JOHN F. MACKAY, Toronto, Ont.
DR. B. E. FERNOW, Dean, Faculty of Forestry, University of Toronto, Toronto, Ont.
DR. GEORGE BRYCE, University of Manitoba, Winnipeg, Man.
DR. WILLIAM J. RUTHERFORD, B.S.A., Dean, Faculty of Agriculture, University of Saskatchewan, Saskatoon, Sask.
DR. HENRY M. TORY, M.A., D.Sc., President, University of Alberta, Edmonton, Alta.
MR. JOHN PEASE BABCOCK, Assistant Commissioner of Fisheries, Victoria, B.C.

MEMBERS, EX-OFFICIO:

HON. T. A. CRERAR, Minister of Agriculture, Ottawa.
HON. ARTHUR MEIGHEN, Minister of the Interior, Ottawa.
HON. MARTIN BURRELL, Secretary of State and Minister of Mines, Ottawa.
HON. AUBIN E. ARSENAULT, Premier, Prince Edward Island.
HON. ORLANDO T. DANIELS, Attorney-General, Nova Scotia.
HON. E. A. SMITH, Minister of Lands and Mines, New Brunswick.
HON. JULES ALLARD, Minister of Lands and Forests, Quebec.
HON. G. H. FERGUSON, Minister of Lands, Forests and Mines, Ontario.
HON. THOMAS H. JOHNSON, Attorney-General, Manitoba.
HON. CHARLES STEWART, Premier, Minister of Railways and Telephones, Alberta.
HON. T. D. PATTULLO, Minister of Lands, British Columbia.

ASSISTANT TO CHAIRMAN, DEPUTY HEAD:

MR. JAMES WHITE., F.R.G.S.

Committees of the Commission of Conservation, 1919

COMMITTEE ON FISHERIES, GAME AND FUR-BEARING ANIMALS

Dr. C. C. Jones, *Chairman;* Mr. J. P. Babcock, Dr. Howard Murray, Dr. J. W. Robertson, Hon. A. E. Arsenault, Hon. O. T. Daniels, Hon. G. H. Ferguson, Hon. Thomas H. Johnson, Hon. T. D. Pattullo, Hon. E. A. Smith.

COMMITTEE ON FORESTS

Senator W. C. Edwards, *Chairman;* Dr. Frank D. Adams, Mr. J. P. Babcock, Dr. B. E. Fernow, Mr. W. B. Snowball, Mr. W. F. Tye, Hon. T. A. Crerar, Hon. Arthur Meighen, Hon. Martin Burrell, and the ex-officio members of the Commission who represent the various Provinces.

COMMITTEE ON LANDS

Dr. J. W. Robertson, *Chairman;* Dr. Frank D. Adams, Dr. George Bryce, Mgr. C. P. Choquette, Mr. E. Gohier, Dr. C. C. Jones, Dr. W. J. Rutherford, Dr. H. M. Tory, Hon. T. A. Crerar, Hon. Arthur Meighen, Hon. Martin Burrell, and the ex-officio members of the Commission who represent the various Provinces.

COMMITTEE ON MINERALS

Dr. Frank D. Adams, *Chairman;* Mr. J. P. Babcock, Mgr. C. P. Choquette, Mr. J. F. MacKay, Dr. Howard Murray, Hon. T. A. Crerar, Hon. Arthur Meighen, Hon. Martin Burrell, and the ex-officio members of the Commission who represent the various Provinces.

COMMITTEE ON PRESS AND CO-OPERATING ORGANIZATIONS

Mr. J. F. MacKay, *Chairman;* Mr. J. P. Babcock, Dr. George Bryce, Dr. Howard Murray, Dr. H. M. Tory.

COMMITTEE ON PUBLIC HEALTH

Sir Edmund B. Osler, *Chairman;* Hon. H. S. Béland, Mgr. Choquette, Dr. C. C. Jones, Dr. W. J. Rutherford, Hon. Martin Burrell.

COMMITTEE ON WATERS AND WATER-POWERS

Hon. H. S. Béland, *Chairman;* Dr. Frank D. Adams, Dr. B. E. Fernow, Hon. Jules Allard, Hon. G. H. Ferguson, Mr. C. A. McCool, Hon. T. D. Pattullo, Hon. E. A. Smith, Mr. W. F. Tye.

Digitized by the Internet Archive
in 2022 with funding from
University of Toronto

https://archive.org/details/31761115556466

CONTENTS

	PAGE
Opening Address ..... *By Hon. Martin Burrell*	1
Acting Chairman's Address ..... *By Hon. Senator W. C. Edwards*	4
Conservation in 1918 ..... *By James White*	10
Appendix I Aluminium, with Special Reference to its Use for Electrical Transmission	57
" II Order in Council *re* Application of St. Lawrence River Power Co	71
" III Argument of Hon. Hugh Guthrie, Solicitor General for Canada	77
" IV Interim Order, International Joint Commission	87
" V Order in Council, Oct. 12, 1918, *re* St. Lawrence River Power Company	91
Housing, Town Planning and Municipal Government ..... *By Thomas Adams*	95
Appendix IV Planning the Greater Halifax	106
" VII The Town of Kipawa	110
" VIII Town Planning in Relation to Land Taxation	113
" IX Civic Improvement League of Canada	116
" X Orders in Council on Housing	123
Committee on Lands ..... *By F. C. Nunnick*	133
Committee on Forests ..... *By Clyde Leavitt*	140
Recommendations of Committee on Forests	161
Quebec Forest Regeneration Survey ..... *By C. D. Howe*	164
How Shall we Make our Forests Safe for Trees ..... *By C. D. Howe*	176
Aeroplane Lumber Production in British Columbia ..... *By Roland D. Craig*	185

PAGE

Medicine in War—Some Sanitary Lessons 192
By Chas. A. Hodgetts, M.D.

Recommendations of Public Health Committee 206

Appendix XI Summary of Recommendations Contained in the Report of the Royal Commission on Venereal Diseases 209

Water-power and Fuel Problems 218
By Arthur V. White

The Power Situation in Canada 243
By Leo G. Denis

Index 255

ILLUSTRATIONS

	FACING PAGE
Shawinigan Water and Power Co.'s Transmission Line Crossing the St. Lawrence River near Three Rivers, Que.	1
Granby Consolidated Mining and Smelting Co., Anyox, B.C.	16
Granby Consolidated Mining and Smelting Co., Anyox, B.C. Copper Ingots ready for Shipment	16
Port Clements, Graham Island, Queen Charlotte Islands	24
Sitka Spruce for Aeroplane Construction	24
Good Seed Pays	34
Children are Interested	34
Taking the Illustration Farm to the Farmer	34
Proposed Replanning of the Devastated Area of Halifax, N.S.	106
Proposed Cross-Section for Hillside Streets	108
Plan of Townsite at Kipawa, Que., prepared by Commission of Conservation	110
Townsite of Kipawa, Que.—Comparative Plan Showing Rectangular Layout of New Town	112
Townsite of Kipawa, Que.—Comparative Profiles Showing Gradients of Main Street	112
Sweet Clover Test on an Illustration Farm in Dundas County	134
Smother Crop to Kill Weeds	138
Clover Seed Crop in Dundas County	138
Forest Conditions in Quebec—The Past and the Future	164
Forest Conditions in Quebec—Why White Pine is being Crowded out of the Forest	164
Forest Conditions in Quebec—Balsam	168
Rived Spruce Cants from which Knotty Heart has been Removed	184
Sitka Spruce Log at Masset Inlet, Graham Island, Queen Charlotte Islands	184
Crest Lines of Niagara Falls	224
Narrows Dam, Yadkin River, Badin, North Carolina	232
Cheoah Dam, Little Tennessee River, North Carolina	232



SHAWINIGAN WATER AND POWER CO'S TRANSMISSION LINE CROSSING THE ST. LAWRENCE RIVER NEAR THREE RIVERS, QUE.

With the exception of the span on the Alcoa, Tenn., transmission line, this is the longest in the world. Length of span, 5,000 feet; conductors insulated for 100,000 volts, and supported on steel towers, 350 feet high.

Face p. 1.

PROCEEDINGS

OF THE

TENTH ANNUAL MEETING

OF THE

COMMISSION OF CONSERVATION

HELD AT

OTTAWA, FEBRUARY 17, 18 AND 19, 1919

THE Tenth Annual Meeting of the Commission of Conservation was held at the offices of the Commission, Ottawa, on February 17, 18 and 19, 1919. The Acting Chairman, Hon. Senator W. C. Edwards, presided. The other members of the Commission present were:—

Hon. A. E. Arsenault,
Dr. George Bryce,
Hon. Martin Burrell,
Mgr. C. P. Choquette,
Hon. O. T. Daniels,
Mr. J. F. MacKay,
Mr. C. A. McCool,
Hon. Arthur Meighen,
Dr. Howard Murray,
Hon. E. A. Smith,
Mr. W. F. Tye.

As the minutes of the last annual meeting had been printed in the Ninth Annual Report, they were taken as read, and approved.

SENATOR EDWARDS: We will now open the tenth annual meeting of this Commission. It was expected that Sir Thomas White would be here this morning, but, unfortunately, a very distressing cold has made it impossible for him to be with us. He has, however, asked a very good substitute to take his place, Hon. Martin Burrell, Secretary of State and Minister of Mines. I have very much pleasure in calling upon Mr. Burrell to address us.

Hon. MARTIN BURRELL: Mr. Chairman, Ladies and Gentlemen: As Senator Edwards has said, Sir Thomas White asked me late last night if I would come here and say a few words by way of opening

this, the tenth annual meeting of the Commission of Conservation, and to convey to you his good wishes. I am sure that I also voice his and the Government's sincere regret upon the news received this morning of the serious illness of the very prominent gentleman—Sir Wilfrid Laurier—who has always taken a keen interest not only in the matters which you are specially met together to deal with, but in everything relating to our common welfare in Canada. I am quite sure, sir, that, conservation being our watchword, we all join in the most sincere desire, regardless of what our views concerning other things may be, that Sir Wilfrid's life may be still spared for many more years of usefulness to his country.

Coming here at the eleventh hour, I am not, of course, going to make anything in the nature of a speech dealing with the subjects that you are here especially to consider; I shall simply say a word or two by way of officially, in a sense, opening your meeting.

We have come through a colossal struggle, during the course of which there has been exhibited an example of waste unprecedented, perhaps, in the history of the world. Fortunately and happily for us, we feel that the great ideals for which we carried on that tragic struggle and endured all that waste, have been vindicated, and that we have conserved the peace, both individual and national, for which we have striven. To those who have followed the expenditures in connection with the war, as well as the general course of events during the struggle, one of the most appalling things has been the realization of the tragic amount of waste, both of material and of man-power, which has taken place during its progress. But there is the redeeming thought that, with the waste a magnificent example of saving of energy, human and material, along all lines, has been demonstrated. I need not cite instances of the marvellous and conspicuous success which has been attained in the effort to save in material alone and in connection with all sorts of products; nor is it necessary for me to point out that many things which in other times would have been regarded simply as fit for the scrap pile have been efficiently devoted to some useful purpose in connection with the prosecution of the war. But this saving has not been shown only at the front, where the struggle was at its height; it has been going on throughout every department of military and civil life in all the countries which have been engaged in the war.

In my own Department, the activities of a great many of our officers and experts have been turned from those things which were not of strictly economic importance, to those subsidiary to the war, and directed to the purpose of carrying out our part in the great

struggle. If I had time, I could give a great many instances in which the work accomplished along these lines has really been noteworthy; many discoveries, which will be of great service in normal times, have been made and a very good and useful purpose has been served. No doubt this is equally true of all the departments.

One thing the war has certainly demonstrated to us is the absolute insignificance of the individual life. Perhaps nothing is more pathetic than the extent to which innumerable lives have been snuffed out of existence. Big men, great men in every respect, have fallen; our minds have become so dulled, through the story of suffering and the constant stream of sensational events, that we find it hard to appreciate the real truth in that regard. And just here, I cannot help thinking of the man who, perhaps, was the great originator of all efforts in the direction of national conservation: I speak of the late ex-President Theodore Roosevelt. Mr. Roosevelt, whose life was, in a sense, shortened by the war, took a profound interest in this matter. He worked with an unselfishness that characterized, perhaps, not all the men of his country who took part in public affairs. He lost one of his sons in the Great War; he served the State in the highest capacity with great distinction. To our regret he has passed away. It was in 1907 that Theodore Roosevelt began a campaign for the elimination of national waste, which culminated in the formation of a Commission of Conservation in the United States. That body was not perpetuated as a branch of Governmental activity as has been the case with the Commission of Conservation in Canada, but in 1909 it became merged in the National Conservation Association, an organization sustained by the dues of the membership, but in which the United States Government takes a sympathetic interest. Their labours are carried out along the same lines as those of the Commission of Conservation here, and aid, no doubt, in the great educational work that is going on all over the continent.

When I was Minister of Agriculture, some years ago, I tried to find out my relationship to the Commission of Conservation, and how far I was concerned in dealing with its various policies and so on. I was informed by the Department of Justice that the Commission of Conservation was neither a department nor a branch of a department; so that I had no responsibility in the matter at all. But, apart from what the Commission of Conservation as a body has done—and certainly the measure of its services in practical work will be determined by its contribution to the welfare of the whole State, and no man will dispute that a great deal of good has been accomplished by it—one of the strongest factors in the national good for which it is

responsible is found in the fact that men from all parts of Canada are concerned with the immense importance of eliminating individual and national waste and with the conservation and development of what, after all, must be the basic part of the material side of our national life. The educational work done by this Commission in its various ramifications all over the country must be of great value. It is a pleasure to me to note the effective work that the members of this Commission and all those who have similar ideas have done in the conservation of our bird life, as evidenced in the consummation of their wishes and efforts in the treaty with respect to migratory birds agreed upon by Great Britain and the United States. Not only, therefore, do the efforts of your Commission and of those connected with your activities, either directly or indirectly, accomplish a great deal, but the more extensively your efforts become known and the more your influence and the influence of those who feel with you is felt throughout the whole country, to that extent the whole country must benefit and be stimulated to further efforts along the same line.

I am sorry that Sir Thomas White is ill this morning and unable to be with you. You can understand, of course, that the strain during the past four years has been pretty hard upon everybody who has had to take part in the direction of public affairs. Happily, we have lived at a time when all the smaller things of life, all party squabbles and petty recriminations, have been absolutely lost in the larger ideals which have been set before the whole of the nation. Indeed, a conspicuous example of this spirit is found in the great peace conference which is going on in Paris. Whatever criticism may be made of the efforts of those who are gathered there, whatever may be said as to the abortiveness of the steps they may take or the weakness of any of the proposals made, there must be, on the part of everybody, a most profound thankfulness that a big, co-operative step has been taken towards conserving the greatest thing to be conserved, the peace of mankind.

———

Senator EDWARDS: Personally, I am sorry Sir Thomas White is not here, because there is a special matter affecting very seriously this Commission and the country that I would like to have referred to in his presence.

It is regretted that Dr. Béland, one of our members, who, since the commencement of the war, has been a prisoner in Germany, and but recently released, has an engagement in the United States and will not be with us. Dr. Jones and Mr. Babcock are ill with influenza. Dr. Robertson, Dr. Tory and Dr. Adams are in England, and Dr. Fernow, I understand, is in bad health.

The programme for the first day will be devoted entirely to the work of the Commission. On the second and third days we will have an informative series of addresses and discussions by men interested in the conservation of wild life in Canada and the United States, which I have no doubt will be very interesting to you all.

Sir Wilfrid Laurier and Conservation

This Conservation Commission, established ten years ago, was one of the favourite ideas of Sir Wilfrid Laurier, who is now on his death-bed. You will regret to hear that his condition is such that possibly a few hours will terminate his career as a public man. In establishing this Commission, he was very hopeful of its accomplishing beneficial results, and certainly some, at least, of his hopes have been realized. But there is still much to be done, and, personally, I expect to see the Commission do a great deal more.

Resignation of Sir Clifford Sifton

It is regretted that a very strong arm of the Commission may be removed in the person of the Chairman, Sir Clifford Sifton, who has sent in his resignation. I believe that his resignation has not yet been accepted, but we may assume that he will no longer be with us. He is one of Canada's most efficient men; no stronger executive officer ever sat in a public chair in the Dominion, and his resignation is a matter of very sincere regret.

In the views that I am about to express, I may be in a very small minority, but my being in a small minority has never prevented me from saying just what I thought. I need not cite all that this Commission has accomplished; it has done a great many things. But, if it had not accomplished any more than the legislation which has been brought about so far as our railways are concerned, and the consequent preservation of our forests, that alone would justify its existence.

Resources Over-estimated

Last year, I referred to the great misconception entertained by some Canadians with regard to the resources of their country. From my childhood, what I have heard more than anything else from our public men has been the statement that we live in a wonderful country, that our numerous natural resources are inexhaustible, and that our possibilities are unequalled. I am frank to say that, until about ten years ago, I fed upon that sort of oratory. I suppose that, even if these politicians believed the reverse to be the case, they would have considered it detrimental to themselves or to their positions to state it; so that it is a very popular thing for public men to go through the country and tell the people how wonderfully rich we are in resources and what a great country we have. Now, would it not be much better

to examine the real situation of our country, to consider our real position, and govern ourselves accordingly in the direction of our affairs?

Handicaps of Distance

The inhabitable portion of Canada is but a fringe of the North American continent. The costs of transporting what we produce are high, because of the great length of our country and its correspondingly narrow width. In agriculture we are comparatively strong; next in importance are, perhaps, our timber resources. Now, if any people in the world are mistaken as to the extent of their timber resources, the people of Canada are. I speak as a lumberman, who has a somewhat general knowledge of our timber resources from the Atlantic to the Pacific, and I do not hesitate to say that, east of the Rocky mountains, our timber resources, in so far as our lumber supply is concerned, are pretty well exhausted. Yet every province enormously over-estimates its wealth in this respect; even British Columbians do not possess anything like the quantity of lumber that they believe they possess. Here, then, is a very fertile field for conservation, though, were it not for the existence of this Commission, our timber resources would be far more materially exhausted than they are to-day.

Pulp Resources Require Conserving

In our pulp resources we are comparatively rich, but, if we do not take better care of them than we have taken of our timber resources, the same result will follow in a few years. In the case of our minerals, also, we enormously over-estimate our possibilities. We are supposed to be rich in respect of our fisheries, but about $30,000,000 is the largest amount we have ever obtained from that source.

Then, there are our water-powers. Canada is not a manufacturing country and can never be, so far as manufacturing for sale in a competitive market is concerned. I do not speak here with any political bias; I speak only as a Canadian, who has the welfare of his country at heart. Many solutions have been suggested for after-the-war problems; many suggestions have been made as to what Canada should do to increase exportation after peace is proclaimed and normal industrial operations are resumed. The intentions of those who make these suggestions may be good, but I hold that none of them will accomplish anything of any consequence.

Directory of Canada's Resources

The Commission of Conservation should publish a compendium of its investigations of what Canada actually has in her various resources—agriculture, lumber, mining, fishing, water-powers—what are the best means of conserving them and putting them into useful operation, and what

we can produce for exportation in competition with other countries of the world; if that were done, some intelligent course could be adopted for the development of these resources for exportation. Under present conditions of reconstruction, the exportation from Canada of manufactured goods may be carried on for a few years, but, in normal times, I am afraid that cannot be done except under bounty—and the granting of bounties is, in my opinion, a great mistake.

Study Canada

I find that I have a few converts to my ideas on this subject. One gentleman who is present made a few remarks at a meeting on Friday night in Montreal, in the presence of the management of one of the very largest financial institutions in Canada; and the very views which I hold in this regard were expressed so far as Canada is concerned. I am not, therefore, entirely alone; I believe that, within ten years, the majority of the people will agree with me on this point. It is all right for Canadians to value their country for what it is, but this over-valuation of our resources befools us, and leads us into expenditures which we would not make if we really knew and understood our country. One indictment I make of the public men of Canada, is that they give the people the wrong lead in this respect, thus injuring Canada. It brings about the construction of railways that are not necessary and that Canada will never use; it leads to many expenditures which would not have been made had the people known the country in which they live. The man who discovers Canada, who learns to know his country, is not the man who travels from Halifax to Vancouver over a railway; it is the man who travels north and south, because he knows the interior of the country. I claim to be in that latter class. I make these remarks regretfully, but I feel bound to make them. I made the same statement in the Senate. I have an ailment which may make it impossible for me to make any extended remarks there again, but, if I do, they will be along the same lines, because I do not want to see my countrymen deceive themselves.

A great work is open to this Commission, to continue the study of the resources of Canada, to continue the study of the possibilities of the development of those resources, and their being placed in competition with the resources of other parts of the world. If that is done, many of the enterprises which are being carried on in Canada to-day will be abandoned, because they have been established, not in Canada's best interests, but to the very great detriment of our country. I believe that what I have outlined is the greatest possible work that this Commission can perform.

The Resignation of Sir Clifford Sifton

Dr. Howard Murray (Dalhousie University, Halifax): Mr. Chairman, the announcement that was made this morning of the resignation of our Chairman, Sir Clifford Sifton, must have been received with a feeling of deep regret, not unaccompanied with dismay on the part of the members of the Commission. Any casual visitor to our meetings here must certainly have been struck with the alertness, the ability, and the great energy of our Chairman; but what his work really meant to the Commission could only be realized by the members of the Commission who have sat here and observed his work. With the able assistants whom he gathered around him he accomplished very much indeed, especially when one takes into consideration the limited means placed at the command of the Commission. While the announcement of his resignation was made some time ago in the press, I have never seen any official statement of the acceptance of his resignation. If there is any possibility of averting the calamity of his withdrawing from the Commission, I think that we should do all we can to accomplish that end. I desire to move the following resolution with regard to Sir Clifford Sifton's resignation:—

Resolved, that the members of the Commission of Conservation, assembled in their Tenth Annual Meeting, have heard with profound regret the announcement that their Chairman, Sir Clifford Sifton, has handed in his resignation to the Government of the position he has occupied among us during the last nine years. The fact that this resignation does not, up to the present, seem to have been accepted by the Government, and has therefore not yet gone into effect, gives them some encouragement for the hope that this threatened calamity may even yet be averted; and the members of the Commission earnestly hope that Sir Clifford may yet be induced to reconsider and to withdraw his resignation.

Dr. Bryce: If I were not in the chair, I would have much pleasure in seconding that motion. When I went to Winnipeg, forty-seven years ago, it was then a village of 215 people. A little while after I arrived there I remember a boy coming in with his father—this was young Sifton. He grew up with us, and made his first impression in Manitoba by entering the political field; for years he was a most efficient member of the Provincial Government and took a keen interest in all matters affecting that western country. Afterwards he was called to the Government at Ottawa, where he had additional opportunity to display his great ability. I know him very intimately, and I know how well he did the work he had to do. We all know what he accomplished in connection with his work with

this Commission; we are all familiar with his industry, his watchfulness, his consideration for all those about him. I am very glad indeed that this resolution has been brought forward.

Mr. C. A. McCool: I have much pleasure in seconding the motion. Like yourself, Mr. Chairman, I saw the work of Sir Clifford Sifton from the start, and I can corroborate every word that you have said in connection with his industry and the foundation he laid for the operations of this very successful Commission.

Dr. C. A. Hodgetts: May I, on behalf of the staff of the Commission, express our very sincere regret upon the occasion of Sir Clifford Sifton's resignation of the chairmanship. We all have had the greatest regard for Sir Clifford in all the branches of our work. Personally, I have always had a good hearing from him, and I know that every member of the staff can say the same. Sir Clifford showed his personal interest in every little detail that from time to time was brought before him. Our service under his chairmanship has been very pleasant indeed, and we hope that he may yet be induced to remain with the Commission.

The motion was carried unanimously.

Resolution on the Death of Hon. G. W. Brown

Dr. Bryce: Mr. Chairman and Gentlemen, you will all regret to hear of the receipt of a telegram announcing the death to-day of our colleague, Hon. George W. Brown, at Regina. Mr. Brown had expected to be with us to-day; in fact, reservation had been made for him at the hotel. He was keenly interested in the work of this Commission, especially as it pertained to the proper planning and settlement of Western Canada, and his loss to our Commission will be great. He has given largely of his time in the interest of the State, occupying among other public offices that of Lieutenant-Governor of Saskatchewan. We shall miss him at our meetings, and I am sure every member will join with me in an expression of our regret at our loss and our sympathy for his family. I would therefore beg to move:

"That this meeting of the Commission of Conservation desires to express its sincere sympathy with the family of our late member, Hon. George W. Brown, whose death occurred at Regina to-day, February 17, 1919.

The resolution was seconded by Hon. O. T. Daniels, and adopted.

Mr. James White, Assistant to Chairman of the Commission of Conservation, then read the following review of the work of the Commission for 1918:

Conservation in 1918

BY

JAMES WHITE, F.R.G.S., M.E.I.C.

Assistant to Chairman, Deputy Head, Commission of Conservation

GENTLEMEN: Before presenting the Annual Review of the work of the Commission of Conservation during 1918, I desire to read a letter from Mr. Babcock, our Commissioner in British Columbia. We had hoped to have a paper by Mr. Babcock with respect to fishery conditions in British Columbia, particularly with reference to salmon. Mr. Babcock says:—

"I am just getting around after an attack of influenza, hence my failure to reply to your notes. I shall be unable to attend the Annual Meeting, and I take it it is now too late to supply you with data as to fishery conditions in this province."

"I may say that the pack of salmon is the largest on record, due entirely to the increase from, and the utilization of, the autumn grades of fish, which have only recently come into demand. The run to the Fraser was very much the smallest ever known. The river may be said to be fished out of sockeye, and the run of pink salmon, which was not used previous to the war, is fast disappearing."*

Unfortunately, this is an exact fulfilment of the prediction that Mr. Babcock made when he addressed us at our last annual meeting.

You will learn with much regret that, owing to ill health, your confrère, Dr. Fernow, is unable to attend the meeting. He has written expressing his regret, and has requested that his letter be read to the meeting. It is as follows:

3 February, 1919

In answer to your announcement of the meeting of the Commission, I regret to say that my physical condition will forbid my attending the meeting.

As I wrote you some months ago, I intended to discuss in a summary way the difficulties, silvicultural, economic and political, in developing forestry methods in Canada, and I would have taken advantage of the opportunity to congratulate the Commission

*The formation of an International Commission consisting of two members each representing Canada and the United States is provided for in the draft of a proposed treaty between the two countries, governing the sockeye fishing industry in the Fraser river in the Dominion, and the lower portion of the strait of Georgia and Juan de Fuca strait, in the state of Washington. The Commission it is proposed to establish would conduct an inquiry into the life history of the sockeye salmon hatchery methods, spawning grounds and other matters affecting the industry. The Commission will be empowered to recommend modifications of the existing regulations under the terms of the draft treaty. The treaty is aimed to prevent the depletion of the sockeye fishing industry. The limiting of the number of licenses is one of the measures suggested to prevent the extinction of the sockeye salmon in these waters. It is proposed to limit the licenses to resident Canadians in British Columbia or to companies licensed to do business in that Province. The same condition would be imposed in Washington by limiting licenses to American citizens or authorized companies.

on the work it has so far done through its Forestry Committee and through the Chief Forester of the Commission, who deserves unstinted praise for his active push, persistency and efficiency.

The Commission has to its credit, first of all, the inauguration of most thorough control over forest fires along railways, which was brought about through co-operation with the Railway Commission and with Provincial and Dominion authorities. In this connection, it has to its credit the publication of some three volumes of discussion on means of suppressing fires and has successfully stimulated private endeavour in this direction.

In this connection, also, the Commission has made an extensive study and demonstration of the result of cutting and subsequent fires on cut-over lands with regard to reproduction. This study was made on a 2,000 square mile sample, the Trent watershed, and a similar investigation has been made in British Columbia, showing that our optimistic anticipations of natural replacement of the valuable timber without human assistance are largely doomed to disappointment.

The Commission was very properly engaged early in ascertaining the status of our forest resources and has completed and published exhaustive forest surveys of two provinces, Nova Scotia and British Columbia, and has surveyed part of a third, Saskatchewan. It has been also instrumental in bringing about, encouraging and aiding stock-taking in a fourth province, New Brunswick.

These are all legitimate and praiseworthy activities of the Commission, whose functions are largely educative. But I would have particularly applauded the latest development of the Commission's forestry work, namely, the establishment of permanent sample plots to study in detail the results in reproduction and growth and different treatment and logging of our pulpwoods. This work has been conducted by Dr. Howe, in co-operation with several paper companies. The readiness with which this co-operation (financial and otherwise) was secured is proof of the practical value of this investigation. Indeed, this is the first systematic attempt to lay a basis for silvicultural practice, without which the forester is helpless, and the Commission is the best agency for securing this fundamental knowledge, as could be readily argued.

That this work of the Commission is done largely in co-operation with the staff and students of the Faculty of Forestry of Toronto University is, of course, specially gratifying to me.

There is one more important political direction in which the Commission, in my opinion, should exert itself, namely, the transfer of the forest resources of the Middle Provinces to those provinces. Such transfer would undoubtedly lead to the exploitation of these resources. Forestry is provision for the future, and such provision means present curtailment of revenue or present outlay for the sake of future revenue. Will and can the provinces afford such a financial policy?

Wishing you a successful meeting,

Sincerely yours,

B. E. FERNOW

59873—2½

Sir Clifford Sifton's Resignation

Since our last annual meeting, Sir Clifford Sifton has resigned his position as Chairman of the Commission. Pending the appointment of his successor, the Acting Chairman, Hon. Senator Edwards, has instructed me to prepare an annual statement of the operations of the Commission along much the same lines as Sir Clifford has done in the past.

First, I desire to refer to the great loss the Commission has suffered by reason of Sir Clifford Sifton's resignation. His untiring energy, his broad outlook, his ability to grasp the factors of a problem and arrive at its solution, and his master mind were well summed up by Augustus Bridle in his *Sons of Canada*, when he said that Sir Clifford is "the greatest constructive statesman that Canada has yet produced."

When we commenced our operations we were without any precedent to guide us, inasmuch as we were a unique organization. No other body, governmental or private, had ever undertaken conservation work on a large or comprehensive scale. The organic Act establishing the Commission, draughted by Sir Clifford, provided for the appointment of representatives of the Dominion Government, of the Government of each province, and of at least one university in each province. At the same time, it also provided for the appointment of representatives from each province and representatives who were interested in our great natural resources.

Efficiency and Economy of Operation

In commencing the work of organization, Sir Clifford laid down some basic rules, which are worthy of record. First, he gave instructions that all materials, printing, binding, etc., were to be purchased in the cheapest market, irrespective of politics, religion, nationality, or other consideration. Second, that the staff should consist of a limited staff of experts, so selected that, in a general way, we would have one expert adviser respecting each of the great natural resources, and that these advisers should, so far as possible, be assisted by clever members of the weaker sex. Third, that when special investigations which could be carried to completion in a limited space of time were undertaken, special investigators would be employed only until the investigation was completed, such action permitting the payment of ample remuneration without, in the aggregate, incurring excessive total cost. Fourth, he suggested that the work of the Commission could be carried on with the maximum of advantage if the work were apportioned to committees, one for each great natural resource and one on publication.

As a result, the Commission can fairly claim that its achievements are out of all proportion greater than its expenditure. An

enormous mass of data has been collected, and much of it has been incorporated in published reports. These publications have made this information available to the public in such enduring form that they will be standard works of reference for many years, particularly as our efforts have been steadily directed to the production of exhaustive reports rather than pamphlets of a superficial or transitory nature.*

Concentration of Effort

Owing to our limited financial resources, we were, from the very beginning, forced to adopt the plan of temporarily spending more money upon one or two investigations than upon any others. Thus, for a time, we expended a maximum upon agriculture, particularly upon our illustration farms.

* The *Atlantic Monthly* for March, 1919, pp. 381–391, contains an article by Mr. Arthur D. Little, intituled 'Developing the Estate.' Mr. Little is the head of the firm of Arthur D. Little Company, and has devoted special attention to the subject of conservation. His firm has been employed by the Canadian Pacific Railway to report on the possibilities of development in the territory traversed by their lines.

In his article, Mr. Little refers only to the United States. He reviews conditions created by the war, the best means of utilizing their natural resources, and the betterment of conditions. He discusses methods of increasing agricultural crops, drainage of swamps, irrigation, prevention of destruction of the forests, better roads, increased use of water-power, more efficient utilization of coal and many similar problems.

It is highly gratifying to find that Mr. Little, after a survey of these problems, and after a comprehensive study of conditions in Canada, recommends for the United States the establishment of an Economic Commission, Though Mr. Little dubs it an 'Economic' Commission, its constitution and functions make it almost a replica of our Conservation Commission.

The testimony of this skilled investigator is so lucid and compelling, that the recommendations are quoted below. Mr. Little says:

> "No Congressional Committee, no academic council, no ephemeral organization can cope with the stupendous problem. The mutually entangled intricacies of its component elements can be gradually reduced to order and woven into the majestic tapestry of an adequate general plan, only, it would seem, by a permanent commission, as detached from partisan politics as the Supreme Court, comprising in its membership the best executive, economic, and technical brains in the country, and planning and operating over long years. This commission should stand in close relationship to the Chief Executive and to the Congress, its members being appointed by the President, subject to confirmation by the Senate. It should be compact, with no more than fifteen members, including the Secretaries of Agriculture, Labour, Commerce, and the Interior, through whom the chiefs of the scientific bureaus of the government would be brought into its deliberations. Above all, its members must be drawn chiefly from the great constructive and productive agencies of the country, and must be truly representative of the aspirations and interests of our citizenship. Whether its individual components are members of House or Senate, Republicans or Democrats, should, in this relationship, be of interest only to their biographers.
>
> "Such an Economic Commission would evolve from many economic studies and proposals for specific betterments co-ordinated plans which would bind together in a close articulation the attainable benefits of each. In the exercise of an intrinsic function, it would submit to Congress recommendations for the required legislation, and apprise the country of the need and reason for its demands. To it should be assigned ultimate responsibility to Congress, through the President, for the execution of its duly authorized proposals."

Having demonstrated the great value of such farms as forcible educative agents, we transferred the farms to the Federal Dept. of Agriculture. Through the results obtained, we thus demonstrated to the farmers of the neighbourhood that one of themselves was obtaining these results without any assistance other than the advice of our experts and at no greater cost than their own farming operations. It was a demonstration that, by following our advice, our illustration farmer could obtain an increased yield, and that practically the whole of the increase was profit.

At another period, we expended a maximum upon water-power investigations, and we may fairly claim that, throughout Canada, we excited interest in this great resource. We published a general work on the Water-Powers of Canada in 1911, followed by the Water-Powers of the Prairie Provinces in 1918, and the Water-Powers of British Columbia will be issued this year.

For a time we devoted special attention to Town Planning and Housing, and we now see the partial fruition of our efforts in the appropriation of $25,000,000 for housing.

War Conditions Emphasize Conservation

Conditions created by the war have directed attention to the necessity of adopting measures of conservation. It is not too much to say that the subject of conservation is uppermost in the minds of the thinking men of the world. The United States has been called the ' most wasteful nation in the world,' but a survey of conditions in Canada, and the high cost of living indicate that Canada is pre-eminent in that respect —a pre-eminence of which we have no reason to be proud. It is axiomatic that the nation which can produce at lowest cost is the nation that will obtain the trade of the world. Hitherto, Great Britain has been the greatest exporting nation, and Germany's failure to oust Britain by a thoroughly unsound system of bounties, special freight rates, subsidies, and special privileges which eventually became an almost unbearable domestic burden, was one of the principal causes of the war.

Canada must Husband Resources

We are now endeavouring to re-adjust ourselves to post-war conditions, but it must be borne in mind that, if we burden ourselves with extravagant and wasteful methods of developing or of utilizing our natural resources, if we destroy our created resources by fire, if we lock up our floating capital in unremunerative works, we are fatally handicapping ourselves in the great race for world trade or for any considerable portion of it.

Since our last meeting, the great world war has practically ended. Our Commissioner, Hon. Dr. Béland, has at last been released

by the Germans. We had hoped to have an opportunity to give Dr. Béland a warm welcome, and to express our deep sympathy with him for the hardships and injustice that he has suffered from the Germans since our meeting in January, 1914. The Acting Chairman, Hon. Senator Edwards, endeavoured to have Dr. Béland address you, but an engagement to give an address in the United States, made several months ago, prevented his accepting.

I regret to have to record that in October last, Miss Norma Johnston, my private secretary, succumbed to influenza. As a result of overwork in the autumn of 1917, while picking fruit on a farm in Dundas county, Ont., her resistant powers were so reduced that she was unable to combat the disease. Able, full of zeal for her work, and a charming personality, she gave her life as a result of patriotically trying to 'do her bit.'

MILITARY SERVICE OF STAFF

Before dealing with the general work of the Commission, I desire to record the military service of the staff during the war.

Pte. P. M. Baldwin, Canadian Army Medical Corps—Mr. Baldwin is Assistant Editor. He twice endeavoured to enlist in combatant corps but was rejected on account of defective eyesight. Determined to do his bit, he enlisted as stretcher-bearer in the Canadian Army Medical Corps in 1916. Later, he was transferred to the 1st Canadian Field Ambulance Corps. After considerable service in France, he obtained a transfer to the 1st Battalion, Canadian Engineers, and is now in Germany.

Pte. James Carroll, 199th Battalion, Duchess of Connaught Irish Rangers—Mr. Carroll was a messenger. He was reported missing August 15th, 1917, and has since been reported 'officially dead.' It is believed that he was either blown to pieces or was buried by a shell.

Bom. Allan Donnell, 46th Queen's Battery—Mr. Donnell is also Assistant Editor. He was badly wounded by a gas shell at the battle of Vimy Ridge. He was invalided to Ottawa, and on Dec. 31st, 1917, discharged as unfit for further service in the army.

Capt. G. H. Ferguson, M.C., Canadian Engineers—Capt. Ferguson is one of our engineers. Commissioned Nov. 1st, 1914, in the Canadian Hydrological Corps, with the rank of captain, he reverted to the rank of lieutenant to go overseas with the Canadian Engineers. He was promoted for duty in France and was decorated with the Military Cross. He was continuously on duty in the forward area until the end of June, 1918, when his leg was broken. Due

to continuous exposure, he suffered from complications. He returned to Canada for a rest, and was convalescing when the armistice was signed.

Col. C. A. Hodgetts, M.D.—Col. Hodgetts is our Medical Adviser. He went overseas in October, 1914, as Commissioner of the Canadian Red Cross. It is sufficient to say that the Canadian hospitals were better equipped, both as regards staff and material equipment, than any other. Col. Hodgetts resigned his position as Red Cross Commissioner in April, 1918. From that date till December last he acted as Deputy Commissioner of the Medical Staff of the Ministry of National Services, serving three months as Assistant to the Commissioner in Ireland. He returned to Canada Dec. 25th, 1918.

Lieut. E. Carruthers Little, 3rd Canadian Ammunition Corps—Lieut. Little was one of the engineers engaged on our civic survey of Ottawa. He enlisted in Sept., 1916, and, later, was given a commission. For his services he has been awarded the Belgian Cross and has been mentioned in despatches. Lieut. Little advanced to the Rhine with the Canadian Forces, and is now in Belgium.

Pte. Oliver Master—Mr. Master is Assistant Secretary. After rejection by the infantry and artillery on account of defective eyesight, he enlisted as a private in the Queen's Ambulance Corps and went overseas. Subsequent to his arrival in England, he obtained a transfer to the infantry. In August, 1918, Mr. Master's platoon was on outpost duty and was surrounded by the Germans in a counter attack. Only three men, including Mr. Master, were able to fight their way back. Later, he was recommended for a commission and was taking his officer's training course when the armistice was signed. You will regret to hear that he is now in Canterbury hospital, England, suffering from the after-effects of injury to his knee from a spent machine-gun bullet.

Pte. Frederick N. McKay, late 77th Battalion—Mr. McKay is a messenger. He went overseas, but was invalided back to Canada and discharged as unfit for further service in the army.

Frederick Corp, one of our messengers, and a married man, endeavoured to enlist, but was rejected by the combatant branches of the service and, later, by the non-combatant branches.

HOUSING

Mr. Thomas Adams will address you on 'Housing in Canada,' and I will only refer briefly to the subject. The Dominion Government has appropriated $25,000,000 for housing, to be expended



GRANBY CONSOLIDATED MINING AND SMELTING CO., ANYOX, B.C.
Power-house and smelter in foreground. Mine in distance, connected with smelter by electric railway.



GRANBY CONSOLIDATED MINING AND SMELTING CO., ANYOX, B.C.
Copper ingots ready for shipment.

Face p. 16.

under the direction of the Housing Committee of the Cabinet, and, on December 12, Mr. Adams was appointed to assist the committee in carrying out this very important work.

In Great Britain, it has been found that the shortage of houses exceeds 300,000, and the Government is going "full steam ahead with building," to quote Dr. Addison, President of the Local Government Board.

A general scheme for the Dominion, drawn up by the Housing Committee, has been approved by the Provincial Governments and is now being used as the basis of legislation for each province. This scheme has received general approval both in Canada and in the United States.

The Order in Council authorizing the loan of $25,000,000 provides: (*a*) Upon request, the Minister of Finance may make loans to the Government of any province of Canada; (*b*) the maximum amount loaned to any one province shall be the proportion of the $25,000,000 which the population of said province bears to the population of Canada; (*c*) maximum period of loan shall be 20 years, the provinces being permitted to repay whole or part of the principal at an earlier date if they so desire; (*d*) interest shall be charged at 5 per cent, payable half-yearly upon advances from the dates thereof, respectively; (*e*) bonds, debentures or other forms of security, if approved by the Minister of Finance, may be accepted as evidencing the indebtedness of any Provincial Government; (*f*) advances shall be made from the War Appropriation; (*g*) advances may be made as soon as a general scheme of housing shall have been agreed upon between the Dominion Government and the Government of the province applying for a loan.

Loans will be granted to Provincial Governments on the following four conditions:

1. Each province shall submit to the Federal Government, for approval, a general housing scheme, setting out the standards and conditions to be complied with in connection with local housing schemes.

2. As the object is to facilitate the erection of dwellings, at a moderate cost, for workingmen, particularly returned soldiers, the following maxima have been fixed:

(*a*) Detached or semi-detached dwellings, with walls constructed wholly or partly of frame, stucco on frame, brick veneer, inclusive of the capital value of the site and necessary local improvements: with 4 or 5 rooms, exclusive of bathroom and summer kitchen, $3,000. With 6 or 7 rooms, exclusive of bathroom and summer kitchen, $3,500.

(*b*) Detached, semi-detached, groups of three or more or duplex (cottage flat) dwellings, with walls of brick, hollow-tile, stone or concrete, and roofing of fire-proof materials, inclusive of the capital value of the site and necessary local improvements: with 4 or 5 rooms, exclusive of

bathroom and summer kitchen, $4,000. With 6 or 7 rooms, exclusive of bathroom and summer kitchen, $4,500.

3. Public money may be advanced for building houses on sites owned by (*a*) The Provincial Government or municipality, (*b*) housing societies or companies, comprising groups of citizens associated to promote good housing, dividends payable by such societies or companies being limited to 6 per cent, (*c*) or owners of lots for the purpose of erecting houses for their own occupancy.

4. The Federal loan will be repayable by the province over a period of 20 years, provided that it may be extended to 30 years in respect of any portion of the loan which the Provincial Government may decide to re-lend for thirty years for such purposes as purchasing land or erecting buildings of a more durable class. Repayments by the provinces on account of federal loans may be made quarterly, if so desired, or otherwise as may be agreed upon.*

The Halifax disaster occurred shortly after our Ninth Annual Meeting. Our Town Planning Adviser, Mr. Thomas Adams was requested to visit the city and prepare a report respecting the reconstruction and planning of the devastated area. The schemes recommended by him were adopted by the Relief Commission and by the City Council of Halifax. The latest information, however, indicates that the plans are not being carried out in their entirety. The first steps in connection with the preparation of a scheme for the whole city have been taken, but it is regrettable that the Relief Commission has no expert adviser.

The St. John town-planning scheme has reached the final stage but still awaits the approval of the City Council and of the Provincial Government. The results obtained are not, however, completely satisfactory, as no accurate topographical map of the area was available, and the city was unable to find the money for the surveys. We are endeavouring to induce one of the Federal Departments to undertake the work of making such surveys of the vicinity of the principal cities of Canada.

The Province of Prince Edward Island has passed into law the Town-Planning Act draughted by the Commission. When the Development Board, authorized by this Act, is appointed, Mr. Adams will co-operate with them in the formulation of a town-planning scheme for the new town of Port Borden.

At the request of Hon. Mr. Taschereau, Minister of Public Works for Quebec, Mr. Adams is preparing a draft Town-Planning Act for that province. If passed, British Columbia will be then the only province without such legislation.

Mr. Adams has supervised the town-planning of the town of Kipawa, Que., for the Kipawa Fibre Co. The present plan provides

*For further details respecting the loan for housing, see Appendix X.

for a population of 2,000 to 3,000, and provision will be made for the anticipated growth. Sewers and water mains are being laid in the sections in which the first buildings are being erected. Thus, the development will proceed evenly and gradually, the conveniences and utilities being constructed to serve built-up sections instead of the usual method, namely, providing for a mixture of buildings and vacant lots.

A Department of Municipal Affairs has been created in Quebec and doubtless will effectively co-ordinate the work of the municipalities.

We are urging that Montreal build a model village, erecting, say, 50 types of houses, thus illustrating in the most forcible and practical way the best ideas in housing and town-planning.

An amended Planning and Development Act has been passed in Ontario which, while an advance on previous Acts, does not go as far as is desirable. We are urging that this act be further extended and widened.

Plans of Hawkesbury Garden Village, Ojibway and Hamilton have been submitted to Mr. Adams for approval and comment. He has also been consulted respecting town-planning and housing at Renfrew, Oshawa, Belleville, London, Chatham, Windsor, etc.

The Ontario Government has appropriated $2,000,000 for housing, to be loaned to municipalities, and a strong committee has been appointed to prepare a report on housing.

During the war, the Manitoba Government has not taken action under its Town-Planning Act, but there are promising indications that the province will appoint a director of housing and town planning. If such official be appointed we may confidently anticipate effective work.

Conferences have been had with the officials of Calgary and Edmonton respecting the threat that certain subdivisions would be taken out of those cities. Every endeavour is being made to assist them to decrease their financial difficulties. To quote Mr. Adams: "The idea is that the land will be planned in such a way that the money now being wasted on local improvements will be saved in the future by carrying out such improvements as will be required to deal with the growth of the population and not with the extraordinary pictures conceived by real estate owners with vivid imaginations."

PUBLIC HEALTH

As Colonel Hodgetts will address you on the general subject of Public Health, particularly with reference to advances made during the last five years, a brief reference will suffice.

Benefits to Health due to War

With so much of evil resulting from the war, it is a satisfaction to find some good results from it. The *Lancet* states that, in Great Britain, functional nervous diseases among the civil population practically disappeared. In Vienna, it was found that all degrees of diabetes were favourably influenced; in males almost without exception and in females, frequently but not universally. Whereas not one of 39 slight diabetics before the war could be regarded as cured, 33 out of 39 became sugar-free under war conditions.

The *Lancet* does not speculate why these good effects were produced. The starvation method of treating diabetes may throw some light on the matter, but it is also not improbable that the great mental and nervous strain involved in the concentration of the mind on outside circumstances may have reacted favourably upon the whole economy.

Work of British Medical Research Council

On the other hand, many nervous affections, that it is customary to call 'shell shock,' have affected our soldiers. As a result of the work of the British Medical Research Committee, it is now possible to take a wider and a more hopeful view of the nervous diseases of the war. Incidentally, mental disease generally has passed from the region of mere expectancy to a reasonable anticipation of beneficial results under proper treatment. Here, again, the war has left a legacy of benefit.

New Medical Diagnosis

The London *Times* points out that, during the last four years, a new medicine, which fundamentally alters the whole attitude to disease, has arisen. A few years ago disease was supposed to be either acute or chronic, infectious or non-infectious, curable or incurable. The patient was said to have dyspepsia or lumbago or Bright's disease or any other disease.

In so stating it, the doctor was, as a rule, only saying that a certain organ had broken down and had become the seat of 'fibrous change,' just as the feet become the seat of fibrous change when corns grow on them. In that conception, the fibrous change constituted the whole disease and was not, as we now know, one of the results of the disease. Doctors thought of the heart or liver or lungs when they should have been thinking of great bodily changes due to assaults upon the whole organism.

Advances in Bacteriology

Bacteriology has demonstrated that infection with certain germs will result in certain fibrous changes which we call disease. Though it had been recognized that such diseases as tuberculosis and syphilis were of bacterial

origin, till recently, the old conceptions respecting many affections, such as heart disease, still prevailed.

The war revealed young men with all the symptoms and signs of heart disease, kidney disease, etc., but the fibrous change was absent. The majority of these men recovered, though suffering from what we had hitherto called 'incurable' diseases.

Germs the Basis of much Disease

Dysentery, trench fever, scarlet fever and other diseases were found to be followed by heart and other organic troubles, which showed that these diseases were due to the invasion of the body by germs. It became evident, therefore, that the so-called fibrous changes, are, in reality, signs of Nature's struggles against disease.

The new medicine does not shake its head over heart murmurs; it seeks the infection, whether in the teeth or throat or alimentary tract or elsewhere, and attempts to eradicate it. "The shining truth, that, if we can prevent or stay infection, we can probably prevent all the effects of infection—that is to say, the bulk of disease—has not yet been seen by all. When it is seen, it will no longer be necessary to conduct an A1 Empire on a C3 population."*

Chronic Disease Due to Teeth

The new medicine has demonstrated that the public should concentrate their attention on one disease almost above all others, namely, decay of the teeth. This disease lowers the health of the child and predisposes it to tuberculosis and disease generally. It is estimated that at least 20 per cent of all chronic disease in Great Britain is due to the teeth.

The president of the Dental Association of New Zealand, in urging the establishment of dental bursaries, stated that 95 per cent of the school children of New Zealand had dental caries. He said that, if cows were similarly affected, they would not be tolerated for one month.

Dr. Sim Wallace, the dental surgeon, states that the chief cause of dental disease is the "adhesive and easily fermentable nature of the modern diet; also meals between meals, and especially the bread-and-milk at bed-time. The last named leaves a poultice over the crevices of, and between, the teeth during the night;" nascent lactic acid forms, attacks the enamel and starts the disease.

*London *Times*, Jan. 6, 1919.

Influenza

Deadlier than War

From a health standpoint, the most important occurrence during 1918 was the world-wide epidemic of influenza and pneumonia. Had the same death rate prevailed during the four-and-a-half-year period commencing July, 1914, it would have caused the deaths of 108,000,000 persons, or five times deadlier than the war. The medical correspondent of the London *Times* says that "never since the 'Black death' has such a plague swept over the world, illustrating, as never before, the need of a new survey of health measures."

It has been stated in the press that game in northern Saskatchewan is being 'decimated' by influenza, that moose are dying from it. On the other hand, scientists have found it impossible to transfer the disease to any of a long list of animals; monkeys alone showed a toxic effect, but true influenza did not develop. These investigators assert that the disease which attacks animals is what is commonly known as epizootic, which, a quarter of a century ago, attacked horses, and thus seriously affected transportation in Canada and the United States.

Goitre

Investigation Undertaken

Alarmed by statements respecting the prevalence of goitre in Alberta and British Columbia, and its baneful effects, the residents of these provinces requested the Commission to investigate this question. Enquiry among some of the best authorities indicated that there was no foundation for the 'scare,' and we were naturally averse to the expenditure of money and time on an investigation which did not promise commensurate results. Eventually, as we were requested by the Provincial Board of Health of Alberta and, as the alarm, instead of decreasing, seemed to be increasing, we agreed to investigate it. It would obviously have been improper to request that the enquiry be undertaken by any one who had taken part directly, or indirectly, in the discussion of the occurrence of goitre in Alberta. We, therefore, requested Dr. Shepherd, of Montreal, Emeritus Professor and late Dean of the Faculty of Medicine, McGill University, and one of the highest authorities in North America, to undertake the investigation. Dr. Shepherd agreed to do so, visited Alberta, and calmed the apprehensions of the people respecting the prevalence and the effects of the common form of goitre. Later, Dr. Shepherd contributed a pamphlet on *Goitre*, which is now in the press and will be issued at an early date. It is proper, also to acknowledge the indebtedness of the Commission and of the people

of Canada to Dr. Shepherd for his valuable services, which have been rendered without remuneration, other than his travelling expenses, and were rendered when his time was fully occupied with his work on the Hospitals Commission.

FORESTS

At the present time we are expending more money upon the investigation of our forests than upon any other resource. Bearing in mind the important part that timber will play in the work of reconstruction, it is peculiarly fitting that we plan to maintain and to increase its economic importance.

Forests and the War

The importance of forests in the war is well known, but, only since the armistice, have we known that cutting in France had reached such a stage that continuance of the war would have necessitated commencing operations in mountainous regions, heretofore considered inaccessible. In Great Britain the end of the reserves of firs and pines, the trees in greatest demand for military requirements, was in sight. To repair the cutting during the war the British Government has appointed an authority with power to make arrangements for developing afforestation in the United Kingdom. This authority has power to obtain seed, raise nursery stocks, train foresters, make surveys, and initiate schemes of afforestation and replanting and to expend up to $500,000 for these purposes.

Canadian Forestry Corps

The operations of our Canadian Forestry corps in Great Britain and France are reported to have saved ocean tonnage sufficient to carry food for 15,000,000 people. In addition, these men will return to Canada with a new viewpoint. The destruction of the forest by fire will no longer be regarded as unimportant. They will return with a tremendously increased realization of the importance of our forests.

Statesmen and business men have repeatedly emphasized the part that the further development of our natural resources must play in reconstruction after the war. Any such programme must take full account of the forest. Such increased development will assist materially in providing against unemployment, through the building up of new forest industries, in addition to the 5,000 wood-using industries already in existence. It will be a large factor in stabilizing economic conditions generally.

Export Trade in Timber

A large export trade is particularly essential to Canada, to redress her unfavourable trade balance. In this direction, our forests hold a position of peculiar strategic importance, both actual and potential. In British Columbia,

for example, it has been shown that the annual lumber cut can be increased five-fold, under good management, without impairing the forest capital stock. This means an enormous export trade, to which the shortage of shipping is still the greatest obstacle.

The present and potential value of Canada's export lumber trade is indicated by the order recently placed by Great Britain for lumber from Canada, aggregating around $40,000,000 in value. It has been estimated that reconstruction in France and Belgium will require 25,000,000,000 feet.

Pulp and Paper Industry

Mr. F. J. Campbell, President, Canadian Pulp and Paper Association, estimates the value of the output of Canadian pulp and paper mills during 1918 at $110,000,000 to $115,000,000, as compared with about $85,000,000 in 1917. During the half-year ending September 30, 1918, Canada exported pulp and paper to the value of $40,636,919, as compared with $31,074,168 during the corresponding period of 1917 and $20,040,745 in the same half-year of 1916. If our exports were maintained at the same rate during the second half of the fiscal year they would aggregate about $80,000,000, or, allowing for a decrease since the armistice, say $70,000,000. During the six months ending September 30, 1918, we exported 980,652 cords of pulpwood, valued at $9,327,901, or at the rate of $18,750,000 per annum.

In 1917, the output of the 3,000 timber and woodpulp plants in Canada aggregated 4,142,711,000 feet. The total cut of spruce was 1,466,558,000 feet; white pine, 791,609,000; Douglas fir, 706,996,000, and hemlock, 332,722,000.

One-fourth of the newsprint used in the United States comes from Canada, and fifteen per cent of the pulpwood consumed in that country is the product of Canadian forests.

Forests must be Recognized as a Crop

As repeatedly stated by Dr. Fernow and Mr. Leavitt, transmuting the wealth-producing possibilities of our forests into permanent actualities requires the general acceptance of the fundamental principle that the forest is a crop rather than a mine, and that cutting operations on non-agricultural lands must be conducted always with a view to the perpetuation of the forest as such.

The practice of silviculture is still in its veriest infancy in Canada, as it is over most of North America. There is still far too strong a tendency toward the practice of forestry anywhere except in the woods. At the same time, it must always be realized that forestry is essentially a business proposition, and that business considerations place definite limitations upon what it is feasible to do in the direction of intensive methods.



PORT CLEMENTS, GRAHAM ISLAND, QUEEN CHARLOTTE ISLANDS, B.C.
Three sawmills were situated here, the centre of the aeroplane spruce production on these islands.



SITKA SPRUCE FOR AEROPLANE CONSTRUCTION
Aeronautical Inspection Department examiner inspecting lumber at a Queen Charlotte Island mill. The labour used at these mills was chiefly East Indian and Japanese.

Face p. 24.

On the other hand, the forest lands of Canada are predominantly Crown lands, and are, therefore, for the most part, the property of the people of the country. It follows that the public interest, from a long-time viewpoint, should govern in determining the conditions under which exploitation should take place. With the present increased stumpage values many things in the direction of better management are now becoming economically feasible which would have been out of the question in years past.

Notwithstanding war conditions, remarkable progress toward better forest conservation has been made during the past year. Mention of these developments may serve to accentuate the respects in which action is still most urgently required.

Nova Scotia

Provincial Forester Required

A conference, under the auspices of the Canadian Forestry Association, was held at Halifax in December last. The necessity of appointing a Provincial Forester was emphasized by the severe fire losses in Nova Scotia in 1918. This appointment was authorized in 1913, and it is hoped that, by a co-operative arrangement with the Agricultural College at Truro, and a small contribution by the lumber interests, it will be made. Improvements in the administration of the fire laws were suggested.

As nearly all the forest lands in the province are in private ownership, it is highly desirable that an educative compaign be carried on, urging forest fire prevention. In addition to this campaign, the Provincial Forester, by co-operating with the Dominion Railway Commission, could render very valuable assistance in preventing fires along railway lines in the province.

New Brunswick

The most important development has been the enactment of legislation respecting forestry and forest fires. The Provincial Forester is now charged with forest protection, forest surveys, land classification, enforcement of cutting regulations, scaling timber and enforcement of fish and game laws, thus giving him more comprehensive powers than any other forestry official in Canada.

Advancement in Forest Service

The adoption of the merit system of appointment to the Forest Service, under civil service restrictions, ensures the high degree of efficiency that the Commission of Conservation has steadily advocated since its inception.

The timber sales policy with reference to limited areas of timber has been adopted. This system is also in operation in British

Columbia for timber areas of limited extent and for all areas in Dominion forest reserves. The 400 square miles disposed of on the timber sales basis last year yielded from $5.50 to $7.75 per M., as compared with an average of less than $3 for spruce, under the old system.

Forest Survey and Land Classification

In 1918, forest surveys and land classification of 465,000 acres were completed; the total area thus examined to date is 1,665,000 acres, or 22·2 per cent of the Crown lands. The cost last year was slightly over 3 cents per acre.

Quebec

The field of operations of the Provincial Forest Service has been much increased by the addition of the administration of fire protection, including the railway fire protection work.

Work of Fire Protection Associations

It is gratifying to note that approximately 80 per cent of the licensed timber lands of Quebec is protected by the St. Maurice Valley, Ottawa River, Laurentian and Southern St. Lawrence Forest Protective Associations. The efficiency of their work has steadily increased, through improved personnel, education of the local public, increased use of modern equipment, and improved means of transportation.

Legislation to compel fire patrol on unprotected licensed lands is contemplated. Lack of adequate patrol on lands within association territory but not held by members of an association, constitutes a danger to surrounding territory.

The Provincial Forest Service has established a fire-ranging system in the Abitibi district, along the Transcontinental railway, west of Parent, and north of the territory of the Ottawa River Association. In this area, 18,500 acres of settlers' slashings were burned under permit, with no loss of green timber.

Ontario

During 1918, a maximum number of 1,044 fire rangers were employed. They were directed by 32 district chiefs, assisted by 41 deputy chiefs. There are four inspection districts, with headquarters at Cochrane, Nipigon, Sudbury and Parry Sound, under the general supervision of the general superintendent of fire protection at Sudbury, the whole organization being directed by Mr. Zavitz, Provincial Forester, Toronto.

Of the 30,172 acres burned during 1918, 60·5 per cent was logged-over land, containing hazardous slash, indicating the urgency of the disposal of logging slash.

Settlers' Permits for Burning

For settlers' clearing fires, principally, 9,590 permits were issued during 1918—an increase of 175 per cent over 1917. The fire-fighting equipment was materially strengthened, and 304 miles of trail was constructed. One-fourth of the forest revenue from the Crown lands of theprovince—$500,000—was appropriated for the work of the Forest Branch.

A Civil Service Commissioner has been appointed in Ontario. As, however, his authority only extends to employees receiving $1,000 per annum and upwards, he has no control over fire-rangers who are employed for the summer only. As the regulations in effect in New Brunswick, British Columbia and in the Federal Forest Service include fire rangers, it is hoped that the Ontario law will be amended to cover such employees.

Supervision over Cutting

To perpetuate the forest through wise use, supervision over cutting operations on all Crown lands should be placed under the Provincial Forestry Branch. Similar action has been taken in New Brunswick, Quebec, British Columbia and in the Dominion forest reserves, exclusive of licensed lands. In the United States the Forest Service is in full charge of cutting operations on 160,000,000 acres of National forests. Leaving technical work of this nature in non-technical hands means, simply, that the forests are administered for immediate revenue only, and that their perpetuation receives little, if any, consideration.

Dominion Lands

Abolition of Patronage

The most important development has been the abolition of the patronage system. Both field and office staffs of the Dominion Forestry Branch are now under the merit system of appointment, and governed by Civil Service regulations. This very important reform has been steadily advocated by the Commission of Conservation for years past, and nothing but increased efficiency and economy can result from it.

Alberta Fire Legislation Requires Revision

Improved forest fire legislation is now in effect in Manitoba and Saskatchewan. It is hoped that Alberta will also revise its legislation to make it more applicable to the northern portion of the province. The introduction of the permit system of regulating settlers' clearing fires is necessary to prevent serious damage to

the forests. Revision of the Prairie Fires Ordinance along lines advocated by this Commission is also anticipated.

Representations have been made to the Government of Alberta* respecting its provincially-chartered railways, aggregating some 350 miles, which are not under the jurisdiction of the Dominion Railway Commission, nor is there adequate provincial legislation respecting railway fire prevention and protection.

We have again to deplore the anomaly whereby the Dominion Forestry Branch, with its staff of trained foresters, has no control over cutting of timber on licensed lands in the forest reserves.

---

* Since the annual meeting, the Legislative Assembly of Alberta has taken action along the lines suggested. By the Statute Law Amendment Act (Bill No. 63 of 1919), effective May 17, 1919, Alberta has, partly as a result of representations made by the Commission of Conservation since the date of the annual meeting, taken partial action with respect to the recommendations submitted by the Committee on Forests. Section 17 of said Act (amending the Railway Act) authorizes the Board of Public Utility Commissioners of Alberta to make regulations with respect to the use of fire-protective appliances on locomotives on provincially-chartered railways. Section 19 (amending the Prairie Fires Ordinance) authorizes the Chief Fire and Game Guardian of the province to make regulations with regard to fireguards and the use thereof by railway companies, and as to the patrol of any line of railway and neighbouring land. Action with respect to the permit system of regulating settlers' clearing fires still remains for the future.

The portions of Bill No. 63 of 1919, above referred to, are as follows:—

"An Act to amend The Factories Act, The Liquor Act, The Soldiers' Home Tax Exemption Act, and certain other Acts and Ordinances."
(Assented to April 17th, 1919.)

. . . . . .

17. The Railway Act, being chapter 8 of the Statutes of Alberta, 1907, is amended as follows:

3. Section 2: By adding thereto the following new clause:
"23. 'Board' shall mean the Board of Public Utility Commissioners."

7. Section 192: By adding to subsection 4 thereof the following;
"The Board may make regulations with respect to the use on any engine of nettings, screens, grates, and other devices which may be deemed by the Board necessary and most suitable to prevent, as far as possible, fires from being started, or occurring upon, along, or near the right of way of any railway subject to the provisions of this Act."

19. The Prairie Fires Ordinance, being chapter 87 of the Consolidated Ordinances of the Territories, 1898, is hereby amended by adding as section 11*a* the following:—

"11*a*. The Chief Fire and Game Guardian may make regulations with regard to fireguards and the use thereof by railway companies, and as to the patrol of any line of railway and neighbouring land. Such regulations shall, unless the Lieutenant Governor in Council shall otherwise direct, conform, as nearly as the circumstances of the case permit, to the regulations issued by the Railway Board of Canada with respect to the same subject matter."

British Columbia

Wood Products Laboratory Established

The timber-testing laboratory, recommended by us in 1916 and 1917, has been established under a co-operative arrangement between the Dominion Forestry Branch, the Imperial Munitions Board, and the University of British Columbia. Attention has been devoted to war work, principally timber for aeroplane manufacture. It is understood that future work will be supplementary to that of the Forest Products Laboratories at Montreal, particular attention being given to local problems of wood utilization.

Last spring a forest-ranger course for returned soldiers was inaugurated at Vancouver. This winter an extended course will be given.

The Provincial Forest Branch secured a hydroplane for patrol work in the Coast district, but, unfortunately, it was wrecked before it was available for use in the field. The branch is using light automobiles and gasolene launches in patrol work, with excellent results.

Aircraft for Forestry Work

The tremendous development of aircraft during the war, and the impending disbandment of our very efficient air force, has directed attention to the possible uses of air machines in times of peace.

Among other suggested uses are forest-fire patrol and photography. It is anticipated that, during the coming season, hydroplane fire patrols will be established by the British Columbia Forest Branch, by the St. Maurice,* and, possibly, by other forest protective associations.

Aerial Photography for Survey Work

For aerial photography the maximum of result could probably be obtained in connection with work in our northern territories, where the canoe constitutes practically the only means of transportation. Airmen, in conjunction with a surveying party, operating along canoe-routes, could obtain valuable information respecting the country on both side of the routes traversed by the surveyors, particularly as such areas are often practically inaccessible by land except at a disproportionate cost of time, money, and energy.

If such aerial work is to be carried out, the services of our disbanded airmen should be procured, and the value of such work determined by experiment. If not carried out on too large a scale, the cost would not be excessive.

*The Toronto *Globe*, April 30, 1919, states that the St. Maurice Association "has made an arrangement whereby two hydroplanes will start on the task of patrol work of their forests by June 1st."

Railway Fire Protection

National Railway System under Railway Commission

Though the Canadian Northern system has been absorbed by the Canadian Government railways, its lines are still subject to the Railway Commission. It is understood that, during next session of Parliament, legislation will be had which will place the Transcontinental, Intercolonial and Prince Edward Island railways under that Commission.* Such action would increase the railway mileage under the jurisdiction of the Railway Commission from 85 per cent, as at present, to 96 per cent. Notwithstanding conditions created by the war, fire losses due to railway agencies have remained satisfactorily low, with some local exceptions.

As it is a reform the Commission has steadily advocated since its very inception, members of the Commission will be pleased to hear that this legislation is at last to be had.

White Pine Blister Rust

This disease has a firm foothold in Ontario south of lake Nipissing, and, in Quebec, it has been found on the currant and gooseberry. Controlling the disease involves the eradication of wild and cultivated currants and gooseberries in and near the region to be protected.

Protection in British Columbia

To protect the white pine of British Columbia, an order in council should be passed prohibiting the transportation of currant or gooseberry plants or other *Ribes* from infected districts into the Prairie Provinces or British Columbia. Such shipments from the Eastern States to the Western States have been embargoed by the United States Government, and similar action by Canada is necessary, particularly as the effect on the nursery business is negligible.

Fungous Diseases

The very serious injury to our forests from fungous and other diseases urgently demands the appointment of a forest pathologist to study such diseases in co-operation with the Division of Forest Insects of the Dominion Entomological Branch. Investigation has shown that logging slash constitutes a breeding ground for destructive insects and fungi, and that

*Since the foregoing was written, Bill 70, "An Act to incorporate Canadian National Railway Company and respecting Canadian National Railways", has been assented to. Section 14 of Bill 70 provides that:

"Notwithstanding anything in the *Government Railways Act* or any other Act, the provisions of the *Railway Act* respecting the operation of a railway (as distinguished from the provisions of such Act respecting the construction or maintenance of a railway) shall apply to such of the Canadian Government Railways as would but for the passing of this Act be subject to the *Government Railways Act*, during such time as the operation and management thereof is entrusted to the Company under the provisions of this Act."

the losses due to such insects and fungi are very much greater than the losses by fire.

In this connection also we desire to acknowledge our indebtedness for the assistance we have received through the able co-operation of Dr. C. Gordon Hewitt, Dominion Entomologist, and of Mr. J. M. Swaine, Chief, Division of Forest Insects, Entomological Branch.

Forest Planting

The large areas of non-agricultural lands that have been completely denuded of forests by unwise methods of cutting, or by fire, can only be restored to productivity, in a reasonable length of time, by planting.

Forest Planting by Pulp Companies

In Quebec, the Laurentide Company and the Riordon Pulp and Paper Company have realized that Nature, if unaided, makes very slow progress toward restoring the pulpwood species on cut-over lands. To date, the Laurentide Company has planted 680,000 trees, mostly spruce, on 453 acres. The company expects to plant 500,000 in 1919, 700,000 in 1920, and 1,000,000 in 1921. The Riordon Company has planted 780 acres to spruce and pine. From 1920, the company expects to plant 1,000,000 spruce and 100,000 white and red pine per annum.

In 1918, the Quebec Government nursery at Berthierville supplied 2,000,000 trees to private land-owners, mostly farmers and pulp companies. The capacity of this nursery is to be increased to 5,000,000 trees per annum.

Reports and Field Work

The report on the *Forest Resources of British Columbia*, by Dr. Whitford and Mr. Craig, is now in the hands of the binder, and will be ready for distribution at an early date. Like all other publications, it has been much delayed by the labour shortage caused by the war.

The report on the *Forest Resources of Saskatchewan* has been delayed by the illness of the author, Mr. J. C. Blumer. Though Mr. Blumer has not been restored to complete health, he is making such progress that we hope to receive the final instalments of manuscript at an early date.

Survey of Ontario Forests

The survey of the forest resources of Ontario has been suspended, owing to the transfer of Mr. Craig to the Ministry of Munitions, to take charge of the inspection of aeroplane spruce lumber in British Columbia. Mr. Craig will return to the Commission at an early date, and will take up the collection and correlation of data respecting the forests of Ontario.

Forest Research

As this question is to be discussed by Dr. Howe, my reference to this investigation will be brief. Our research work in co-operation with the Laurentide and Riordon companies, and with the Dominion Entomological Branch, has been continued under the direction of Dr. C. D. Howe.

St. Maurice Valley

Dr. Howe is making a careful study of the reproduction and growth of the pulpwood species in the St. Maurice valley, Quebec. As he finds that present methods of cutting in Eastern Canada are destructive and that there is no adequate provision for the future, he is endeavouring to ascertain what modifications of cutting methods are necessary to secure adequate reproduction and growth. Unless checked, the increasing predominance of the hardwoods in the mixed forests will, eventually, eliminate the spruce and balsam as commercial species. Apparently, logging the hardwoods as well as the conifers is the only solution of the problem.

Dr. Howe's investigations show that, under the cover of hardwoods, the average 4-inch balsam in the St. Maurice valley is 55 years old, the average 8-inch tree is 70 years old, and it was 80 years old at 10 inches in diameter, breast high. At 4 inches in diameter, the average red spruce was found to be 80 years old; at 8 inches, 120 years old, and at 12 inches, 165 years old.

Lessons from Growth Studies

The crucial point is Dr. Howe's statement that our growth studies, so far as they have been made, indicate that, with the exception of the white birch-balsam type, the trees of the smaller diameter classes grow so slowly that they cannot be depended upon to reach commercial size during a period within which the lumberman can afford to hold his limits. More data must, of course, be obtained before we can say that this conclusion has been carried to a demonstration.

It is not too much to say that this investigation of our pulpwood resources—which we trust will determine the measures necessary to ensure their perpetuation—is one of the most important questions now in progress by the Commission or any other governmental organisation, and we can congratulate ourselves upon being the pioneers in this matter, inasmuch as we initiated it early in 1917.

Work of Commission Endorsed

The value of our investigations has been recognized by the Pulp and Paper Association, as well as by financial contributions from the Laurentide and Riordon companies. The Abitibi Power and Pulp Co. has also discussed the possibility of a similar co-operative arrangement respecting inves-

tigation of conditions on its limits, and it is not improbable that this work will also be undertaken. As the tree species on the Abitibi Company's limits differ materially from those on the Laurentide and Riordon areas, such investigation would yield results of much value with reference to that type of forest.*

That means that we shall be able to extend our investigations into that portion of Ontario lying to the north of the height-of-land.

Aeroplane Lumber Production

Prior to the entry of the United States into the war, large amounts of Sitka spruce for aeroplane manufacture were purchased from United States brokers, nearly all of which was obtained from the forests of Washington and Oregon. In 1917, the requirements of the aeroplane factories of the United States reduced the spruce available for export to an amount that jeopardized the air programme of the Allies, and the Imperial Munitions Board in Canada was requested to secure 24,000,000 feet of aeroplane lumber.

Supplies of Sitka Spruce

In connection with our report on the *Forest Resources of British Columbia*, we had procured data which showed that there was, in that province, 14,165,345,000 board feet of Sitka spruce, of which approximately 34 per cent was on the Queen Charlotte islands and 31 per cent on the Northern Mainland coast. Most of this information was based upon confidential data but, by loaning our Forest Engineer, Mr. R. W. Craig, to the Munitions Board, these data were made available without breach of confidence.†

Owing to the rigid specifications, particularly as regards straight-grained wood, only a small percentage of the lumber which could be used for ordinary purposes was suitable for aircraft. In addition, practically all the available timber had been alienated, the owners were not prepared to operate their limits and the saw-mill capacity in northern British Columbia—the area which contained 65 per cent of the Sitka spruce—was inadequate.

---

*Since the above was written, the following telegram has been received from the Abitibi Pulp and Paper Company:

"It is our intention to begin a reforestry programme this year along the lines discussed with you here and desire co-operation of your department."

†Under date March 20, 1919, Brig. Gen. W. E. Edwards, Director of Inspection, Imperial Ministry of Munitions, wrote that, owing to the termination of the war, Mr. Craig would shortly be able to return to the Commission. Gen. Edwards added:

"I desire to express my obligation to your Commission for the loan of Mr. Craig's services. He has filled a difficult position, in which his expert knowledge has been invaluable, with great credit"

Cutting rights were granted by order in council, mills that had been closed were re-opened, new mills were erected, and tugs, gasolene launches, scows and barges were chartered to transport the lumber.

Increase in Production

The production of spruce increased from 116,000 board feet in January, 1918, to 6,850,000 feet in December; the production of Douglas fir increased from 209,000 feet in January to 1,382,000 feet in December. Total production in 1918: Spruce, 26,124,000 feet; fir, 9,224,000 feet.

Owing to the shortage of spruce, Douglas fir was used for wing-beam stock. It was selected from commercial stock at the mills, the recovery averaging only two per cent.

Best Timber from the Old Trees

The supply of Sitka spruce for aeroplane manufacture is so limited that it is estimated that cutting, on a war basis, for another year, would have practically exhausted all the wood that is procurable at a reasonable expenditure of money and effort. Obviously, steps should be taken to conserve the remaining supplies of this material. Cutting it for pulp or commercial lumber should be prohibited. Only the large trees contain the clear, fine-grained lumber required. Most of the aeroplane material was obtained from trees 500 to 800 years old, and such trees cannot be replaced for centuries, if ever.

LANDS

Our work in connection with the Committee on Lands has included: (1) The continuation of the illustration work in Dundas county, and (2) general publicity work.

Illustration County Work

During 1918, the work on the 16 farms in Dundas county, where better farming methods are being practised, included the following:

1. System and methods of farming, embracing planning, crop rotation, seed and variety selection, tests of different thicknesses of clover seeding, tillage, live stock and manure.
2. Labour, machinery and equipment.
3. Business methods—selling, buying, co-operation.
4. Educational work—schools, clubs, school fairs.

Going to the Farmer

At our First Annual Meeting the late Mr. C. C. James said that the solution of the problem of better agriculture was not the taking of the farmer to the experimental farm but the taking of the experimental farm to the farmer. The latter was the policy adopted by us in initiating illustration



GOOD SEED PAYS

Silage corn grown from selected seed on an Illustration Farm in Dundas County.



CHILDREN ARE INTERESTED

Two varieties of oats grown on an Illustration Farm ready for exhibition at the School Fair.



TAKING THE ILLUSTRATION FARM TO THE FARMER

Neighbouring farmers listening to the Commission of Conservation's Agriculturist explaining results of comparative tillage methods on this Illustration Farm. They are in the field where the tests were made and can see for themselves. Seeing is believing.

Face p. 34.

farms in each province. Later, we transferred these farms to the Dominion Department of Agriculture, that they might be extended and carried on upon a much larger scale than our limited financial resources would permit.

Results already Apparent

In Dundas county—which was selected as being a typical area, and easily accessible from Ottawa—we have 16 illustration farms in the four townships which constitute the county. We can now see the results of work done on our advice, such as the effect of adding lime to the land prior to growing clover, results from thick seeding and from thin seeding of clover seed, from the use of certain varieties of seed, particularly of barley, oats, potatoes and corn. For instance, we demonstrated that seeding with potatoes grown in Northern Ontario or New Brunswick increased the yield by from 15 to 100 per cent as compared with potatoes grown from southern Ontario seed.

Our Agriculturist, Mr. F. C. Nunnick, has held numerous meetings on our illustration farms in Dundas county, all of which have been well attended. The large numbers of farmers at these meetings, and the interest shown by the questions and discussions, demonstrate, if demonstration were needed, the great value of our work in this area.

Unfortunately, the excessively wet weather experienced in Eastern Ontario last autumn prevented the harvesting of many fields of corn and potatoes, the crops rotting in the ground.

Farmer's Account Book

Advice respecting greater use of agricultural machinery and of labour-saving devices has resulted in much greater use of these highly efficient aids to agriculture. During the year a Farmer's Account Book was published. It is exceedingly simple and has been in great demand, particularly in Manitoba, Saskatchewan and Alberta. Other farmers' account books have been published from time to time, but have failed because they were too complicated to secure adoption by the average farmer.

Our Agriculturist has given addresses at numerous points throughout Canada. At the fair at Winchester, Dundas county, the Commission had a tent containing an educational exhibit of crops grown on the illustration farms and an automatic projector showing results obtained by improved agricultural practice.

WATERS AND WATER-POWERS

During the year the shortage of electric energy for power purposes in southwestern Ontario continued to affect production. It curtailed natural growth; a number of new enterprises which desired to obtain power were unable to do so, and municipalities receiving energy from the Niagara system of the Hydro-Electric Power Commission were required to reduce their consumption by from 15 to 30 per cent of their maximum demands in December, 1917. Though the cessation of the manufacture of munitions will release some 30,000 to 40,000 h.p., this power will be absorbed by the municipalities and by power-users whose demands have been curtailed.

Niagara Power Developments

All the water at Niagara Falls allotted to Canada and the United States under the Boundary Waters Treaty—56,000 cub. ft. per sec.—has now been apportioned to the various development companies. Certain interests are now urging that the treaty be amended to permit the diversion of a larger quantity of water, one proposal being that each country be permitted to divert 60,000 cubic feet, or 120,000 cubic feet in all.

SENATOR EDWARDS: How much power would that be altogether?

Mr. WHITE: It depends very much upon the head under which it is utilized: at the present time, 56,000 second-feet is developing about 650,000 horse-power; 120,000 cubic feet per second would yield about 1,400,000 horse-power, if only the head at the falls were utilized. If it were developed on the same plan as the Chippawa, and operated under a head of 305 feet, the proposed total diversion of 120,000 second-feet would yield approximately 3,600,000 h.p. Of course, these are calculations that I am making off-hand. However, it is not necessary to divert any more water to double the power output at Niagara Falls, because, if adequate power is not obtained by means of the present diversion, it can practically be doubled by utilizing the water in the same way as the Ontario Hydro-Electric in their Chippawa-Queenston development, namely, by using the descent in the rapids above and below the falls as well as the fall in the cataract itself.

Hydro-Electric Extension

The Chippawa-Queenston development of the Hydro-Electric, referred to above, will consist of 6 units of 50,000 h.p. each, or 300,000 h.p. in all, operating under a net effective head of 305 feet. In other words, the output of the Chippawa plant will be equivalent to 80 per cent of the present output of all the plants on the United States side of Niagara Falls. It will use 10,000 cubic feet per second, conveyed through $4\frac{1}{2}$ miles of

canalized river and 8½ miles of excavated canal. The estimated cost is $25,000,000, and it is hoped that it will be completed in 1921.

On the United States side of the river the Hydraulic Power and Manufacturing Co., Niagara Falls Power Co., and the Cliff Distributing Co. have been consolidated. The consolidated company has a present capacity of 370,000 h.p., and an extension, to be completed this year, will contain three units of 33,000 h.p. each, an additional capacity of 100,000 h.p.

Big Eddy Conservation Dam

The most important water conservation work now under construction in Ontario is the International Nickel Co.'s Big Eddy conservation dam on the Spanish river, in Algoma district. This dam will raise the level of the river 100 feet, and will create a lake with an area of 15 square miles. Combined with the storage in the upper third of the Spanish River watershed, it will increase the minimum flow to over 1,800 cubic feet per second, or almost three times the natural low-water flow, namely, 675 cubic feet per second. It will also create a power site, where 15,000 h.p. can be continuously developed.

The engineer who designed this work, Mr. Henry Holgate, states that:

"When this work is complete, the waters of the Spanish river above the township of Hyman will be conserved to their full extent, and this will be one of the most complete systems of water conservation in Canada.

"Conserving water, and regulating flow on our streams, is one of the most important subjects we have before us, and merits the co-operation and assistance of the Government, as it should be a cardinal principle in power development that the full efficiency of the water in the watershed be made use of, and this cannot be done unless carefully considered systems of storage are provided, so as to equalize the flow as nearly as possible throughout all seasons of the year."

St. Lawrence River

Private Development in the St. Lawrence

Last year, the St. Lawrence River Power Co., a subsidiary of the Aluminum Company of America, constructed extensive works in the bed of the St. Lawrence river, although such action was in defiance of the terms of the Ashburton Treaty. This action was taken under permit from the United States War Department, but without obtaining the necessary consent from the Government of Canada. Subsequently, the company applied to the International Joint Commission for authority to erect—as an essential part of these structures—a submerged weir in the South Sault channel of the St. Lawrence, a short distance

below the works above referred to, and asked for immediate consideration of the application as a ' war measure.'

Anchor Ice Reduces Output

The St. Lawrence Power Co. contended that, during the winter of 1917-18, ice difficulties in the canal leading to its plant at Massena, N.Y., had reduced the output of aluminium by 7,000,000 lbs.; that there was urgent need of this metal for war purposes, and that the United States Government was pressing them to increase their production. At the same time, the cross-examination elicited the information that the construction of this dam would increase the available power at their Massena plant from its present maximum of 73,000 h.p. to 200,000 h.p. As the company estimated the cost of the dam and appurtenant works at only $350,000, this application, if granted, would be an enormously valuable concession.

Hon. Hugh Guthrie,* Solicitor General, opposed the application on behalf of Canada. He demonstrated that, under the terms of Article VII of the Ashburton Treaty, which provides that all channels on both sides of Croil, Long Sault, and Barnhart islands shall be kept " equally free and open," the International Joint Commission had no jurisdiction unless and until the consent of the Government of Canada had been obtained. The Commission of Conservation, Canadian shipping interests, and other organizations urged most strongly that no proprietorial rights whatsoever be granted to the applicant company, but that all works placed in the St. Lawrence be constructed by Canada and the United States jointly. This action was in conformity with the policy adopted by the Commission of Conservation from its inception, namely, steady opposition to the granting of control of the St. Lawrence to private interests.

Joint Commission Consents

Eventually, the International Joint Commission gave decision,† stating that, although they were uncertain respecting the question of their jurisdiction as affected by the Ashburton Treaty, they were granting the right to erect and maintain the dam for the duration of the war or for five years, whichever term should be longer.

For all practical purposes, the Aluminum Company of America was the applicant for this highly valuable privilege, and, therefore, a brief reference to this corporation may be of interest. This company‡

*Hon. Mr. Guthrie's address is such a complete and convincing statement on behalf of Canada's rights and claims that it has been printed in Appendix III. See p. 77.

†The Decision is printed as Appendix IV, p. 87.

‡*The Mineral Industry during 1917*, pp. 12-13, states that, commencing with a capitalization of $1,000,000 in 1889, it now has an authorized capitalization of $20,000,000, on which it paid a dividend of 10 per cent in 1916; that "the company has invested about $70,000,000 of undivided profits in its business; its present investment in plant is about $80,000,000. The market value of its $20,000,000 stock is probably $150,000,000."

absolutely controls the manufacture of all aluminium* in North America. According to the statement of its president at Montreal in August last, the company's plants have the following capacities:—

Niagara Falls, N.Y.	35,000,000 lbs.
Maryville, Tenn.	25,000,000 "
Badin, N.C.	†20,000,000 "
Massena, N.Y.	58,000,000 "
Total capacity of United States plants	‡138,000,000 "
Shawinigan Falls, Que.	**20,000,000 "
Total capacity, Canada and United States	158,000,000 "

A table published in the New York *Electrical World* states that, in April, 1914, there were 54 transmission systems in the world operating at and above 70,000 volts. Of the 27 systems in the United States, only 5 were using aluminium conductors, as compared with 22 using copper. In Canada, 4 systems were using aluminium and 1 using copper. Our report on *Electric Generation in Canada* shows that the aluminium transmission lines of 10,000 volts and over, in Canada, aggregate 13,000 wire-miles, as compared with 8,000 wire-miles of copper.

Dam in St. Lawrence

During 1918, the New York and Ontario Power Co. applied to the International Joint Commission for authority to erect a dam in the Little channel of the St. Lawrence river, near Waddington, N.Y., and to make improvements which would increase the present flow through said channel. This application is still pending.

These and numerous other problems, such as the increased diversion of water at Chicago, national saving of fuel by restrictions and economies, saving of power and light in factories, the elimination of uneconomical plants and processes, standardization, the growth of co-ordination of power production have been under consideration during the past year and will be covered by the address of our Consulting Engineer, Mr. Arthur V. White.

Success of Steam Turbines

The subject of water-power development is receiving much attention at the present time, particularly in the United States, where 76 per cent of the total power is generated by steam prime movers. Steam also generates 72·5 per cent of the power in electric generating stations. Data for Canada respecting *total* power generated are not available, but our

*For further data respecting aluminium, see Appendix I, p. 57.

†*Mineral Industry*, p, 12. states that the plant at Badin "was largely increased in June, 1917 and has run at full capacity ever since. Its capacity has been stated to be 65,000 k.w., capable of furnishing 23,000 [metric] tons [50,600,000 lbs.] of metal annually."

‡*Mineral Industry*, p. 13, estimates the production in the United States in 1917 at 200,000,000 lbs.

**According to *Mineral Industry*, p. 14, the Canadian exports of aluminium in ingots and bars were "22,324,600 lbs., valued at $7,620,953, or 34·1 cts. per lb. The production was greater than this by.... about 3,500,000 lbs.," making the production at Shawinigan about 26,000,000 lbs. which is equal to 11,800 metric tons.

recent investigations show that, in the Dominion, only 13·7 per cent of the power in *central electric stations* is generated by steam. That steam has been able to hold its own in the United States, in spite of the high efficiency of water-power, is largely due to the extraordinary success of steam turbines.

On the other hand, owing to war conditions, the price of labour has increased enormously. As pointed out by Mr. Julian C. Smith, Vice President and Chief Engineer, Shawinigan Water and Power Co., "the effect on the cost of power from existing steam plants, as compared with existing water-powers, has been to practically double the cost of power from steam plants and to only slightly change the cost of power from the water-power plant previously built."*

Mr. Smith also states that the capital cost of a water-power plant is twice that of a steam plant and that, if this cost is high because of high labour costs, the water-power plant is "handicapped forever". He concludes that, for many years, steam plants will be of primary importance and water-power plants of secondary importance, but excludes from this dictum the great powers of Niagara and the St. Lawrence which have great inherent and special advantages.

Messrs. Gilbert and Pogue, Division of Mineral Technology, United States National Museum, point out that " when a ton of material passes through a manufacturing plant, it means, with due qualifications, that the railroads have hauled a ton of raw material from far and wide and will move a similar weight of products away for distribution."† They urge that, during stress of industrial expansion, the freight-hauled coal, to be used for the generation of power, may create an impossible situation. If, however, electric energy be transmitted to points where energy alone is required, transportation would be relieved of a burden of coal haulage.

Hydro-Electric versus Steam-Electric

Whether a steam-electric plant be already established on a steam-power basis, or whether it be desired to expand a service or to establish a new operation, the first cost is low and the chief item of operative expenditure is for fuel, which is unavoidable, but is spread over the years of operation. The legitimate capitalization, therefore, is the cost of erection and equipment of a steam-power plant.

In a hydro-electric development, however, conditions are reversed; the great burden falls on the initial cost of development. The interest upon the capital invested in the plant is much the most important item of gross operating expenses. An analysis‡ by Mr. Gano

**The Canadian Engineer*, Dec. 26, 1918, p. 551.

†*Power: Its Significance and Needs*. Bull. 102, Part 5, Smithsonian Institution, p. 10

‡*Proceedings, American Institute of Electrical Engineers*, May, 1916, p. 585.

Dunn of the gross operating expenses of a typical steam-electric station and hydro-electric station of 20,000 h.p. each, gave the following: In the steam station, coal absorbed 48.9 per cent of the gross operating expenses and bond interest 19.0 per cent, whereas, in the hydro-electric station, bond interest constituted 77.4 per cent of the gross.

The foregoing does not appear to present an unassailable case in favour of hydro-electric development in the United States, except where an advantageous position with reference to markets and low unit cost present economic advantage. The coal-less provinces of Ontario and Quebec, however, do not present the same basic conditions, and the substitution of hydro-electric energy for bituminous coal imported from the United States for the generation of power would justify an expenditure possibly not justifiable upon purely economic grounds.

Central Electric Plants

In many instances, the centralization of electric plants presents economic advantages and economies. In Great Britain the Ministry of Reconstruction has reported on a plan of centralizing the production of electric power in Great Britain. There are some 600 private and municipal central plants for power production. The report emphasizes the wastefulness of a "system whereby a man at Hampstead cooks his breakfast by electricity from one station, travels to his office by that from a second, lights his office by that from a third, and takes lunch at a restaurant supplied by a fourth."

While it is doubtful whether the foregoing could be paralleled in Canada, there are localities where centralization of electric plants would result in substantial economies.

MINES

In July last, Mr. W. J. Dick, our Mining Engineer, resigned, to accept a more lucrative position in Winnipeg. Pending the appointment of a successor to Mr. Dick, your Assistant to Chairman has had to carry on this branch of our work as best he could. In addition, it it is quite evident that we cannot get a competent mining engineer for the salary we were paying Mr. Dick.

With the exception of gold mining, the mining industry in Canada has been stimulated by the war. The figures of mineral production for the last seven years are as follows:—

1911	$103,220,994	1915	$137,109,171
1912	135,048,296	1916	177,201,534
1913	145,634,812	1917	189,646,821
1914	128,863,075	1918	211,301,897*

*Since the Tenth Annual Meeting, Mr. John McLeish, Chief, Division of Mineral Resources and Statistics, Dept. of Mines, has courteously supplied corrected statistics. The data respecting production have, therefore, been brought up to date.

It should be borne in mind that these great advances in values during the last three years do not represent an equal increase in tonnages, inasmuch as nearly every metal, except gold, has greatly increased in price.

Production of Coal

The production of coal increased in all the provinces except Nova Scotia. The greatest increase was in the production of Alberta to meet the deficiency caused by the war and the war measures of the United States Fuel Administration. The amount of United States bituminous coal available was much less than usual. In addition, shipments of anthracite to Canada were reduced to 77 per cent of the amount actually imported in 1917, although that amount had proved to be inadequate during the excessively cold winter of 1917–18. For Western Canada, the United States Fuel Administration gave instructions that anthracite shipments were to be reduced to 65 per cent of the tonnage usually shipped to Winnipeg and to 50 per cent of the amount normally shipped to the remainder of Manitoba; no anthracite being shipped to points west of Manitoba. The deficiency thus caused by these measures was met by the largely increased shipments of Alberta coal.

The total production of marketable coal in 1918 was 14,977,926 short tons, valued at $55,192,896—the largest tonnage except in 1913. The production included 115,405 tons of semi-anthracite, 11,636,190 tons of bituminous, and 3,226,331 tons of lignite.

Production in Alberta increased to 5,972,816 tons, as compared with 4,736,368 tons in 1917, and 4,014,755 tons in 1913—an increase of nearly $1\frac{1}{4}$ million tons as compared with 1917, and of nearly 2 million tons as compared with 1913.

Decline in Nova Scotia Output

During the winter of 1917–18 statements were made in the press that it was possible to largely increase the production of coal in Nova Scotia. This optimistic view was not shared by us, and, in February, Mr. Dick was instructed to report on the probable shortage. Mr. Dick, basing his report on confidential information received from the principal mining companies, estimated that Nova Scotia would produce only 5,259,000 long tons (5,890,000 short tons), as compared with 7,980,073 short tons in the 'banner' year, 1913, a decrease of two million tons, or nearly 25 per cent. This estimate was communicated to the Dominion Government and to the Fuel Controller, Mr. C. A. Magrath. The actual production was 5,195,144 long tons (5,818,562 short tons)—practically as stated by Mr. Dick.

Mr. Hiram Donkin, Inspector of Mines for Nova Scotia, states that the falling off in the production of coal in Nova Scotia was largely

due to the decrease in the number of men employed at the coal face; many men of this class volunteered for overseas service, and their places were filled by men whose rate of production was somewhat less.

Nickel Refining in Ontario

The tonnage of nickel produced in 1918 was more than double that produced in 1914. In 1905 the yield was 18,876,315 lbs.; in 1910 it was 37,271,033 lbs.; in 1914 it was 45,517,937 lbs., and in 1918 it was 92,076,034 lbs., valued at $36,830,414. Three-quarters of the world's production of nickel is mined in Ontario and, with an era of lower prices, the proportion is likely to increase rather than decrease. The nickel refining plant of the International Nickel Co., at Port Colborne, Ont., was put into operation in July, 1918.

Copper Production Largely Increased

The production of copper was much stimulated by the enormous demand for war purposes, the greater portion of this metal being obtained from the large low-grade ores of British Columbia and the nickel-copper mines of Sudbury, Ont. The production in Ontario amounted to 23,524 tons (47,047,801 lbs.), valued at $11,586,932. The International Nickel Co. and the Mond Nickel Co., combined, produced 23,472 tons, or 99·8 per cent of the Ontario output. British Columbia produced 31,429 tons (62,858,628 lbs.), valued at $15,480,823. In the latter part of 1916, electrolytic refineries for copper and for zinc were put into operation by the Consolidated Mining and Smelting Co. at Trail, B.C.

Less Gold Produced

The total production of gold in 1918 amounted to 710,526 ozs., valued at $14,687,875, as compared with 738,831 ozs., valued at $15,272,992 in 1917. The gold production of Ontario was 411,270 ozs., valued at $8,501,705, $247,876 less than in 1917, due to the severe handicap under which producers of this metal are operating. The Hollinger, one of the great gold mines of the world, yielded two-thirds of the Ontario production, or $5,752,370.

Silver also Shows Decline

The production of silver in 1918 is estimated at 21,284,607 ozs., valued at $20,597,540, as against 22,221,274 ozs., valued at $18,091,895 in 1917, a decrease of 4·2 per cent in quantity, but an increase of 13·8 per cent in value. Ontario produced 17,109,389 ozs., valued at $16,557,098, or 80·4 per cent of the total silver production of Canada. As all but 0·3 per cent was produced in the Cobalt district, the dominant position of this area is apparent.

Lead and Zinc Feel War Effect

In 1900, during the development in East Kootenay, lead production in Canada reached its maximum, 63,169,821 lbs. It declined to 18,139,283 lbs. in 1903, increased to 56,864,915 lbs. in 1905, and fell to 23,784,969 lbs. in 1911. Owing to demands for war purposes, production in 1915 increased to 46,316,450 lbs. In 1918 it was 43,846,260 lbs., valued at $4,055,779.

The total production of zinc during 1918 was 16,832 tons (33,663,690 lbs.), valued at $2,746,620, as compared with 14,834 tons, valued at $2,640,817, in 1917, and 4,551 tons (9,101,460 lbs.), valued at $474,459, in 1914.

The production of steel ingots and direct steel castings during 1918, was 1,893,000 short tons, as compared with 1,745,734 tons in 1917, and 823,641 tons in 1914.

Advances in Use of Magnesite

During 1918, magnesite from the Grenville district, Que., became available for use for furnace linings, thus replacing the mineral heretofore imported from Austria and Greece. It had been assumed that, owing to the high lime content of the Grenville mineral, it could not be used, but the exigencies of war conditions induced experimental work, which demonstrated that, when properly treated, it makes a rammed or burnt-in lining comparable with the best Austrian. The total shipments of magnesite in 1918 aggregated 39,365 tons, valued at $1,016,765, as compared with 58,090 tons, valued at $728,275, in 1917, and 358 tons, valued at $2,240, in 1914.

Manufacture of Ferro-Alloys

One of the most important metallurgical advances is the development of the manufacture of the ferro-alloys, particularly ferro-silicon. The Electro Metals, Ltd., of Welland, Ont., is the largest electric ferro-alloy industry in the British Empire. This plant has a capacity of 48,000 tons of 50 per cent ferro-silicon, and of 25,000 tons per annum of carbon-electrodes. In addition to its use in steel manufacture, ferro-silicon, with 85 per cent silicon content, was in demand for use in the manufacture of balloon gas.

Petroleum and its Products

The war has demonstrated the enormous value of petroleum and its products, particularly gasolene. In the pre-war period, large reserve stocks of petroleum were carried in the United States, but the enormously increased demand, coupled with declining production, reduced the amount on hand January 1, 1918, to about 153,000,000 bbls., although a storage of about 50,000,000 bbls. is required to fill the pipe lines and keep the industry in operation. At the same time, if consumption of petroleum in the United States were to

continue to increase at the same rate as during 1902-16, the reserves would be exhausted about 1932. Obviously, these reserves will not be exhausted, because increased prices, growing imports and other causes will prolong the life of the wells.

Gilbert and Pogue state* that from 90 to 30 per cent of the oil is left underground and that, deducting losses by fire, seepage and evaporation, probably less than 25 per cent of the petroleum underground reaches the pipe-line. If we subtract from this proportion the losses involved in improper and wasteful methods of utilization, the recovery factor becomes perhaps as low as 10 per cent.

Of the world's output of petroleum, 66,000,000 tons, the United States contributes 66 per cent, Russia about 13 per cent, Mexico about 11 per cent and the entire British Empire less than 3 per cent (2·7).

The production of Canada is 25,100 tons, or ·04 of 1 per cent, of the world's production of this raw material which is indispensable to the processes of modern manufacture and transportation.

"To-day it enters into our daily life under the guise of at least 250 different and marketable commodities. It lights our lamps and stoves; it cleans our clothes; it prepares our varnishes; it acts as a substitute for turpentine in the printing, dyeing and painting industries; it invades our tables in the form of artificial butters, confectionery and a number of other edibles; it supplies us with our wax, our candles, our vaseline, our chewing gum, and a vast array of ointments, salves and drugs; it furnishes the dressing-table with perfumes and the smoking-room with matches; it imparts the final lustre to collars and shirts, and the textile trades use enormous quantities of it for finishing soft goods; it medicates our bodies and gives to preserved fruits their peculiarly toothsome appearance; it blends with animal and vegetable oils in a range of combinations almost infinite; its residue can be burned as coke or used in the manufacture of electric arc-lights or employed in road-making as a rival to asphalt; it lubricates our machinery and drives our motor-cars, our ships, our aeroplanes, our locomotives, our ploughs and tractors. By means of it every form of transportation on land, in the air, on the sea and below the sea, has been immeasurably extended and in many instances revolutionized. There must be at least a hundred trades that now use oil for heat and power purposes where ten or fifteen years ago they used nothing but coal."†

At the London Oil Congress in 1912, it was shown that the *Mauretania*, for the round trip from Liverpool to New York, by changing from coal to oil would save 5,000 tons of fuel, reduce the stokehold force from 300 to 30 and would make available for cargo

**Petroleum—A Resource Interpretation*, Bulletin 102, Part 6, p. 41, Smithsonian Institution, 1918.

†*Ibid*, p. 41.

and passengers a space of about 100,000 cubic feet, representing an earning value of $50,000 on each round trip.

Although we have no oil-fields comparable with the Pennsylvania, Texas, Oklahoma and other fields in the United States, the chances of discovering oil in Alberta may properly be described as promising. The production of the Petrolia oil-field, in southwestern Ontario, in 1918, was 288,692 bbls., as compared with 528,959 bbls. in 1908.

Economic Utilization of Coal

Since its organization in 1910 the Commission has given special attention to the more efficient utilization of coal, the objects aimed at being the use of (1) lignite, either as mined or with the expenditure of the minimum of cost and effort in preparing it for use; (2) the more efficient utilization of coking coal in plants near large markets, producing coke and gas as primary products, and tar, ammonium sulphate, etc., as secondary products; (3) manufacture of carbo-coal; (4) pulverized fuel; (5) carbonized lignite briquettes.

Restricting Coal Exports.

In Great Britain, the war has emphasized the enormous value of certain coals. In the Durham field, certain seams contain a coal peculiarly adapted to the manufacture of a fine hard coke, low in ash and sulphur. The Carbonization Committee of Great Britain has recommended that export of this particular quality of coal should be forbidden; that, if there is a sufficiently large reserve of coking coal to meet the demand of the British iron and steel industry, it should only be exported as metallurgical coke that the valuable by-products may be retained for use in the dye and many other valuable domestic industries. Practical difficulties in connection with mining will almost certainly prevent carrying the recommendations into effect, but it is noteworthy as indicating the great value of such coals as a national asset.

Economies in Furnace Operation

Due to the shortage of fuel, attention has been directed to the possibilities of economies in furnace operation. In large industrial establishments in the United States, it has not been unusual for expert heating engineers to effect a saving of 20 to 30 per cent of the fuel account. About 24,500,000 tons of bituminous and lignite coal is consumed in Canada each year. If our consumption were reduced by only 10 per cent, it would represent an annual saving of at least $7,500,000, much of which is expended for coal imported from the United States.

The Alliance Power Co. state that, by burning lignite slack, they have succeeded in reducing the coal bill in the Edmonton, Alta., power house from $165,000 a year, to $75,000; also, that, if an automatic stoker were devised which would "respond and evaporate the necessary water in the boilers to handle the overload at peak", much better results could be obtained.

Uniform Mining Act Suggested

Mr. H. A. Mackie, M.P., Edmonton, is urging that a Canadian Coal Mining Act be passed by the Dominion, contingent upon the antecedent consent of all provinces, the operation of the Act being left to the provinces.

Mr. Mackie has requested the Department of Labour to call a conference of the Chief Inspectors of Mines of the various provinces. Whether the provinces would consent or not, there can be no doubt that, as pointed out by Mr. John T. Stirling, Chief Inspector of Mines for Alberta, laws should be identical in, say, British Columbia, Saskatchewan, and Alberta, with provision that the operation of all coal mines in these provinces be under the supervision of persons holding certificates of competency, granted by the authorities of either province. Similarly, this situation should obtain with reference to Nova Scotia and New Brunswick.

Waste in Small Mining Operations

Mr. Stirling further states that there are nearly 300 mines in operation in Alberta, about 60 per cent of which is operated in such a small way that it is impossible to make them a commercial success. All the coal that is easily accessible, chiefly along the river banks, is mined by driving in a gangway for a few hundred feet from the outcrop, and, owing to the operator's inability, financially, to put in proper supports, these gangways are allowed to cave in after two or three years' operation, with the result that the larger bodies of coal lying beyond these worked areas will require to be obtained in years to come by expensive shaft sinking.

In addition to this, the danger of driving into old workings which are flooded with water is constantly increasing, so that the chances of catastrophies are also very much increased.

Reduction in Anthracite Prices Unlikely

The fact that the price of anthracite has steadily increased during the past quarter of a century, and the well established fact that, if consumption continued at the present rate, the anthracite of the United Sates would be exhausted in less than a century, demonstrate that the theory of lower prices after the war is utterly fallacious. Even prior to the war, the production of anthracite was decreasing at the rate of approximately one per cent per annum. The problem in Canada, therefore, is: What can be done in the way of producing a fuel that approximates to anthracite or toward the utilization of lignite under more advantageous conditions?

The Research Council has suggested that briquetting of carbonized lignite furnishes the solution, and the sum of $400,000 has been appropriated for the erection of an experimental plant. Construction of this plant has not yet been commenced.

Development of Carbocoal

In Great Britain, much attention has been devoted to carbocoal, the process yielding a fuel that is denser, dustless, clean, uniform in size and quality and stands transportation without disintegration; its density is greater than that of coke and more nearly approaches that of anthracite; the yield of tar and ammonium sulphate is greater than in the by-product coking process.

Pulverized Coal Successful

Pulverized coal, for certain purposes, has achieved remarkable success, particularly in cement plants, copper smelting and other metallurgical processes, and several United States railways have successfully operated locomotives with this class of fuel. With the exception of the Calgary plant, which uses natural gas, all plants of the Cement Company of Canada are using pulverized coal. It has recently been adopted by the British Columbia sugar refinery, and the International Nickel Co., Copper Cliff, has installed it. Experimental runs in the blast furnaces at Copper Cliff, Ont., showed that not only could pulverized coal replace the more costly coke, but the tonnage of fuel consumed was reduced 30 per cent.

Substitute for Anthracite Necessary

The striking economic advantage of central coking plants, producing retort coke for fuel, gas, coal tar, ammonium sulphate, etc., has been set forth in earlier reports, and need not be recapitulated.

The steadily increasing price and the decrease in the reserves of anthracite demonstrate that, in Ontario and Quebec, we must turn to some form of coke that possesses most of the characteristics of this valuable fuel, such, for instance, as carbocoal or retort coke.

The greatest obstacle to the introduction of retort coke is the fact that, hitherto, practically all coke, except gashouse coke, has been produced for metallurgical purposes and, for obvious reasons, such coke could be most economically produced at or near the coal mine. The fact that central coking plants in the immediate vicinity of large cities, can market not only coke but the gas, tar and all other products demonstrates their great economic advantage. In addition, the fuel produced by a retort coke plant would be better adapted for domestic heating, for raising steam and for similar purposes, than metallurgical coke would.

For large individual consumers, locomotives and certain other uses, pulverized fuel promises to revolutionize present practice. It is almost axiomatic that the less labour and cost expended on the preparation of coal fuel, the better, and, other things being equal, the process that approaches most closely to this dictum is the most efficient and the most economic.

A pamphlet on *Pulverized Fuel*, by Mr. W. J. Dick, is now in the press and will be issued at an early date. In August last, your Assistant to Chairman addressed the Professional Meeting of the Engineering Institute of Canada at Saskatoon on *Fuels of Western Canada and their more Efficient Utilization* and, later, expanded it for publication.

FUEL SHORTAGE

Since our organization nine years ago, we have given special attention to fuel problems, as we recognized that, sooner or later, a combination of circumstances would cause a shortage of fuel.

Commission Gives Warning

In February, 1917, we issued a news letter, warning consumers to lay in their supplies of coal immediately, in view of the probability, almost a certainty, that there would be a shortage. It was widely reproduced throughout Canada and the fact that, during the next four months, the anthracite imports were much above normal indicates that it had a very material effect.

Canada's Supply Reduced

Our survey of the underlying conditions had convinced us that, unless conditions were unusually favourable, the mines of the United States would not produce sufficient anthracite for our needs in Canada. The great bulk of the anthracite is consumed in the Northeastern and North Central states and in Canada. Owing to the the enormous development of industries connected with the war, there had been a great influx of population into the Northeastern and Atlantic states north of the Potomac, the addition to the population of Massachusetts, New Hampshire, New York, Pennsylvania and Maryland, since 1911, being estimated at 5,000,000, or 15 per cent. The tremendous congestion of freight in this industrial area, the removal of millions of men from the producing to the non-producing class, and the transference of increasingly large numbers of men to ship-building, munitions, and other highly-paid war industries, and other factors could have only one effect, namely, an insufficient supply of anthracite in Canada.

In March, 1918, our conclusions were strikingly verified by the announcement of the United States Fuel Administrator that we would receive only 77 per cent of the anthracite imported by us in 1917-18, which amount had been found insufficient. Commencing in December, 1917, we had urged a greatly increased cutting of wood fuel, and the increased production materially assisted in tiding over the shortage of anthracite last autumn. Had the war continued till the spring of this year (1919) and had we even had a normal winter, conditions in many parts of Canada would have been serious.

LIBRARY

About midsummer of 1917 conditions in the coal-mining industry in the United States demonstrated that drastic action was necessary. On July 12, 1917, Mr. C. A. Magrath was appointed Fuel Controller, with full powers over the mining, transportation, distribution, etc., of coal. During the winter of 1917–18, the shortage of coal became acute; 'heatless Mondays' were ordered in Canada and the United States to save fuel, the situation having been much aggravated by the almost unprecedented cold weather.

Reduction of Output due to Influenza

During the height of the influenza epidemic the production of anthracite fell off from 2,000,000 tons per week to 1,500,000, or 25 per cent less than during the same week in 1917. Fortunately, the unprecedentedly mild weather and the termination of the war have averted what would otherwise have been a serious situation.

Having happily escaped a fuel famine this winter, we should endeavour to formulate a sane and wise policy respecting the development of our great water-powers, particularly Niagara and the St. Lawrence, and the more efficient utilization of our bituminous, semi-bituminous and lignite coals, that future fuel shortages will not find us unprepared.

SENATOR EDWARDS: Do you mean for heating or for power purposes?

MR. WHITE: Both; in order that we may obtain more efficient results from these coals than can be obtained under existing circumstances, particularly when they are consumed raw. Electric energy generated from our water-powers, should be utilized for power purposes, that our imports of bituminous coal from the United States may be reduced. It cannot be too strongly emphasized that future fuel shortages are not a possibility but are practically a certainty, and they will recur whenever there is a sufficient combination of adverse conditions. In addition, an educative campaign should be carried on urging the adoption of economic methods of firing, the replacement of ineffective boilers and similar measures that will reduce the coal bill.

FIRE PREVENTION

Since our last meeting, our report on *Fire Waste in Canada*, by Mr. J. Grove Smith, has been issued. It is the first report on the subject ever issued in Canada and has aroused public interest in a remarkable manner. That this interest might be crystallized into definite action, the Commission has, during the past year, carried on a campaign of publicity through the newspapers and by means of public addresses. Municipal authorities have been advised respecting

the adequacy of their water-works systems for fire protection purposes and equipment of fire departments, such advice necessitating making complete surveys of several municipalities.

Fire Prevention Leagues Established

Mainly as the result of our efforts, fire prevention leagues have been organized in Ontario and British Columbia. In addition, an advisory committee has been appointed by the Dominion Superintendent of Insurance to inaugurate education of the public and to advise the government respecting fire prevention legislation, movements have been started to have fire marshal acts enacted in the provinces of Quebec, Nova Scotia and New Brunswick, the fire insurance companies operating in Canada are attempting to revise the present insurance agency system in the interests of fire prevention, local authorities are increasingly adopting the recommendation of the Commission with respect to the periodical inspection of buildings, and there is every reason to believe that, eventually, the entire programme outlined by the Commission in its report will receive legislative endorsation.

Excessive Fire Losses

The record of fire losses in Canada for 1918 emphasizes the necessity of drastic steps being taken to bring about a change in the public attitude towards fire waste. During the year the total value of property destroyed by fire amounted to no less than $33,600,000, and exceeded by over 35 per cent the loss of the previous year. If the amount of money spent on fire protection and insurance be added to the direct fire loss the total reaches over $65,000,000. In other words, if the loss continued at the same rate for nine years, it would aggregate an amount that would equal the entire subscription to the last Victory Loan. The record of fire losses for 1918, classified according to the amount of loss involved in each fire, is given herewith.

	Fires over $100,000		Fires from $10,000 to $100,000		Fires less than $10,000	
	No.	Loss	No.	Loss	No.	Loss
January	8	$ 1,057,000	34	$ 873,000	1,499	$ 535,000
February	7	1,467,000	15	319,000	1,423	602,000
March	3	575,000	15	668,000	1,264	537,000
April	5	1,500,000	21	1,120,000	1,802	723,000
May	10	1,652,000	19	906,000	1,528	1,177,000
June	6	1,277,000	15	833,000	1,723	1,006,000
July	7	960,000	19	841,000	1,246	1,395,000
August	3	812,000	22	1,183,000	1,638	971,000
September	1	250,000	15	419,000	1,107	667,000
October	5	3,650,000	9	646,000	984	1,121,000
November	2	300,000	14	402,000	1,518	965,000
December	5	1,150,000	16	376,000	1,347	688,000
Total	62	$14,650,000	214	$ 8,586,000	17,079	$ 10,387,000

For many years the people of Canada have felt that the tax for fire insurance is unduly high, but, instead of blaming themselves for creating and maintaining conditions that cause excessive fire waste, have, in large part, devoted their attention to the insurance companies. While not contending that the insurance companies are altruists, it should be borne in mind that they are simply playing the part of distributors. They collect a certain amount of money from the insured, deduct certain amounts for commissions to insurance brokers, for office and other expenses of management, for dividends to their stockholders, and pay out the remainder to policyholders who have sustained fire losses. Obviously, if fire losses increase, rates must be raised to meet such losses. On the other hand, if there were no fire losses, the insurance companies would have to go out of business.

Large Fires Responsible

The fire loss in Canada is increasing at an alarming rate, the total for 1918 being $33,623,000, as compared with $24,800,000 in 1917, $25,600,000 in 1916 and $19,022,000 in 1915. In 1918, there were 276 fires, causing a loss of $10,000 or over, as compared with 238 in 1917, 218 in 1916 and 237 in 1915. The largest monthly total was that of October—$5,119,145—which included the explosion in the munitions plant at Trenton, Ont., resulting in a loss of $3,000,000.

Mr. J. Grove Smith's investigations demonstrate that a few fires cause two-thirds of our fire loss. In 1918, we had 17,355 fires in Canada, entailing a loss of $33,623,000, but $23,236,000, or 69 per cent, of that loss was caused by 276 fires. Again, only 62 fires were responsible for a loss of $14,650,000, or 44 per cent of the total loss.

Small Percentage of Loss due to Dwelling Fires

Much eloquence has been devoted to the advocacy of an educative campaign to instruct the children of Canada respecting greater precautions against fire, the basic idea being that many fires would thereby be prevented. While recognizing the great value of such education, it must be borne in mind that, even if the 12,000 dwelling fires which occur every year were prevented, it would only reduce our fire loss by 5 per cent, whereas, *if the less than 300 fires which annually damage large mercantile establishments and manufacturing plants could be prevented, two-thirds of our fire waste could be avoided.*

Mr. Smith recommends that the following legislation be enacted:

(1) Requiring a signed application (on a standard form) for all insurance, the statements in such application to form a condition of the insurance contract and a continuing warranty during the currency of the policy.

(2) Requiring the registration and licensing of all agents and brokers placing insurance with companies operating under Dominion license, license to be issued by the Superintendent of Insurance after examination of the character and qualifications of the said agents and brokers.

(3) Requiring the proper inspection by insurance agents of all property whereon the total insurance exceeds $5,000, and making compulsory the notification of defective or dangerous conditions in buildings to the Provincial Fire Marshal's department.

(4) Empowering Provincial Fire Marshals to prevent the issuance of insurance and to cancel all existing insurance upon property reported as being in a dangerous condition until such conditions have been remedied.

(5) Requiring the installation and proper maintenance of automatic sprinkler systems in all buildings (fireproof buildings excepted) which, together with their contents, have an insured value exceeding $100,000.

To carry these recommendations into effect, legislation by both the Dominion and the various Provincial Legislatures must be had, though much can be accomplished by amendments to the present Regulations of the Dominion and Provincial Insurance Branches.

CONSERVATION OF GAME AND WILD LIFE

During the year, we have co-operated with the Advisory Board on Wild Life Protection. Your Assistant to Chairman is Chairman of the Board and represents the Commission thereon.

Migratory Bird Convention Act

The Regulations under the Migratory Birds Convention Act are now operative, and, with few exceptions, the provinces have amended their legislation to conform with the terms of the treaty and are administering these laws, the Dominion taking action only when requested to do so by a province.

The Regulations under the new Northwest Game Act are now in effect. They provide increased protection for the game and fur-bearers of our northern regions which constitute so important an economic asset. The licensing of the fur trade will give a control that will ensure its adequate conservation. The musk-ox, wapiti and wood bison are now permanently protected.

Point Pelee a National Park

Point Pelee, Ont., the most southerly portion of Canada, has been established as a National park, for the protection of the birds which concentrate there during migration or breed there. It is hoped that Bonaventure island, Percé rock and the Bird rocks in the gulf of St. Lawrence will be segregated as bird sanctuaries.*

*Since the above was written the Quebec Legislature has, on the recommendation of Hon. Mr. Mercier, Minister of Colonization, Mines and Fisheries, passed an Act, establishing bird sanctuaries on these islands.

The Advisory Board took a strong stand against any unwarranted relaxation of our game laws for the purpose of increasing the food supply. New Brunswick has now prohibited the sale of game, making, in all, three provinces that have adopted this policy so essential to game protection. Efforts are also being made to check the excessive slaughter of moose in the Yukon for the market.

Killing Deer to Increase Meat Supply

To increase the meat supply, the province of Ontario killed a number of deer in Algonquin Park. In all, 650 deer were killed and yielded 66,221 lbs. of meat, or one-half ounce of meat for each inhabitant of the province of Ontario.

The wapiti is protected everywhere except in Saskatchewan. A letter from the Premier, Hon. Mr. Martin, addressed to the Advisory Board, indicates that the game laws of that province will be amended during the current session to give this magnificent animal protection there also.*

The North American Reindeer Co. proposes to import reindeer from Alaska, and has applied for a grazing lease of a large area in Manitoba and the Northwest Territories northwest of Churchill. If the experiment be successful, this herd will supply animals for transportation and will add to the meat supply.

Conference on Wild Life Protection

Our Committee on Fish, Game and Fur-bearing Animals and the Advisory Board on Wild Life Protection, jointly, have called a conference of game officials of the Dominion and Provincial Governments and of others interested in the conservation of game, fur-bearing animals and wild life generally. This conference will be held here to-morrow and the day following and valuable results are anticipated.

It is expected that the report on our *Wild Life Resources and their Conservation*, which is being prepared by Dr. C. Gordon Hewitt, who has continued to act as special adviser to the Commission in the protection of game and wild life, will be completed shortly and will be published during the year.

COMMITTEE ON PRESS AND CO-OPERATING ORGANIZATIONS

That conservation is receiving so much attention in Canada is largely due to the work of the Commission of Conservation. The Commission initiated the work of publicity respecting conservation of natural resources and to this body, a large measure of resultant public interest is undoubtedly due.

*Since the foregoing was written, the Province of Saskatchewan has also passed legislation protecting the wapiti, commonly called the elk.

Interests of School Children

Through the medium of *Conservation* and *Conservation of Life* the public is kept in touch with what is of interest in the conservation and protection of Canada's public domain.

Canada's resources and their development receive far too little attention in our schools. *Conservation* is distributed monthly to 2,600 school teachers, and, through them, many thousands of Canada's younger generation have the enormous importance of the efficient utilization of Canada's natural resources impressed upon them.

The Commission has supplied to the Khaki University in London numerous copies of its reports. These publications are being used as text books in the continuation courses. Their study by the soldiers overseas will prove of great value to the men, personally, and also, through the creating of added interest in their country, be a distinct advantage to Canada.

Canadian Press Supports Conservation

The newspapers of Canada have stood loyally back of *Conservation* and have given largely of their space to reprinting its material. They have also very generously made editorial reference to Canada's natural resources and their protection. Especially has this been the case recently regarding the proper planning and preparation of land for soldiers homesteading. The newspapers and periodicals of Quebec have given unlimited space in the campaign for securing the passing of a Town Planning Act by the Quebec Legislative Assembly.

Our editor was present at the annual meeting of the Canadian Press Association, when the opportunity was taken advantage of to impress upon the visiting editors the work of the Commission and its value to Canada.

Conservation and *Conservation of Life* have been issued regularly as also special newspaper bulletins as occasion required.

Reports Published

The Annual Report was issued in English and French. A departure was made this year from the usual custom, in that the larger portion of the edition was bound in paper covers. This has effected a considerable saving, as the cost of cloth binding has very materially increased.

Fire Waste in Canada, by J. Grove Smith, our Fire Prevention Engineer, was published, and has had a very heavy demand. This report has been widely commented upon, and has aroused much interest in fire prevention.

Forest Resources of British Columbia, by Dr. H. N. Whitford and Roland D. Craig, has just been issued, as has also *Electric Generation and Distribution in Canada*, by Leo. G. Denis.

A *Farmer's Account Book*, prepared by F. C. Nunnick, containing a simple method of book-keeping for farm use, has been printed. The number of requests from active farmers has exhausted the first edition, and a further edition is being prepared.

The following pamphlets have also been issued: *Wood Fuel to Relieve the Coal Shortage in Eastern Canada*, by Clyde Leavitt; *Fuels of Western Canada*, by James White; *Handbook for Farmers*, by F. C. Nunnick and E. P. Bradt; *Utilization of Fish Waste in Canada*, by J. B. Feilding; *Fishways in the Inland Waters of British Columbia*, by A. V. White; *Conservation of Man-power in Canada*, by Dr. P. H. Bryce; *Garbage as Feed for Hogs*, by F. C. Nunnick; *Powdered Fuel*, by W. J. Dick, and *Goitre*, by Dr. F. J. Shepherd.

There is in press a report on *Water-Powers of British Columbia*, by A . V. White, and in course of preparation *Forests of Saskatchewan*, by J. C. Blumer, *Urban Planning and Dvelopment*, by Thomas Adams, and *Wild Life in Canada and its Conservation*, by Dr. C. Gordon Hewitt.

In June last, by order in council, the printing of the Commission was brought under the Department of Printing and Stationery, and the cost of its execution by the Printing Bureau will be charged to the Commission. Previously, all the Commission work has been executed by private printing plants, after competitive tenders had been secured. This plan was found to be economic and efficient, the work being executed at a minimum cost and good service being secured.

APPENDIX I

Aluminium, with Special Reference to Use for Electrical Energy Transmission

Historical

The aluminium industry began in a very modest manner in the early 'eighties' of the last century. Several factories were operated on the St. Claire Deville method, of which the one at Salindres, France, produced $2\frac{1}{2}$ tons of aluminium annually. The production increased only slowly to begin with, as will appear from the appended table* showing the world's production in metric tons†:—

1880	2.4	1907	19,800
1885	13	1908	18,600
1890	175	1909	31,200
1895	1,426	1910	43,800
1900	5,000	1911	45,000
1901	6,900	1912	61,100
1902	8,350	1913	78,790
1903	8,200	1914	84,857
1904	9,300	1915	86,394
1905	11,500	1916	112,626
1906	14,500	1917	173,500

In a review‡ of the international aluminium industry, published in 1917, it was stated that the demand for aluminium had increased greatly during the last few years. While the German, Swiss, French, and British works have had difficulty in extending greatly under war conditions, the aluminium industry in the United States has made enormous progress. The world's production of aluminium during 1917 is estimated at 173,500 metric tons, and, if the extensions and new constructions now in process of execution are taken into consideration, the capacity will increase to 200,000 tons in the near future. Such a large production would prevent excessive prices of aluminium, but it is questioned whether sufficient supply of alumina, bauxite, cryolite, etc., will be on hand in time to produce 200,000 tons.

---

*Statistics for 1880–1902 from *Engineering*, Aug. 16, 1918, p. 163; for 1903–12, from *Metallgesellschaft, 1903–1912*, p. 16; for 1912–17, from *Mineral Industry during 1917*, p. 10.

†The metric ton is 2,204 lbs, but, as these statistics are only close approximations or estimates, it is assumed to be 2,200 lbs.

‡*Electrical Review*, London, March 30, 1917.

59873—5

Figures relating to the occurrence of aluminium show that it is the third in the list of elements of the body of the earth (7·90 per cent, according to F. W. Clarke) and as No. 1 of all the metals (iron comes next with 4·43 per cent).

Bauxite

Bauxite is the only available ore of aluminium. Its consumption has been steadily increasing since the outbreak of war, not only as a source of this valuable metal, but for abrasives, brick for metallurgical furnaces, etc.

Statistics of production in the United States, France, United Kingdom, Italy and India, during 1913-17, are given on p. 59.

"Bauxite has been discovered in considerable quantities in British Guiana . . . Development work has now reached a stage where a steady output is assured . . . The British Government is now taking a firm stand with regard to the exploitation of these deposits and is determined that the first call shall be reserved for the British Empire."* In December, 1917, it was announced that no further applications for bauxite lands would be granted till after the war. The Government also ordered that a portion of the bauxite won by holders licensed before this regulation came into force must be placed at its disposal at a certain price and, also, reserved the right to limit or to prohibit the export to countries other than British. Following the promulgation of these regulations, "a large export to a foreign country of British Guiana bauxite, won by a company in which foreign interests are partly represented, was held up."†

In view of the possibility that additional plants for the manufacture of aluminium may be established in Canada, the foregoing statement respecting British Guiana bauxite is of interest.

No commercial ores of aluminium have, as yet, been found in Canada. Aluminium is, however, made in the Northern Aluminum Co.'s extensive works at Shawinigan Falls, Que., from bauxite ores imported from France, the United States, and also, formerly, from Germany. The company also operates a wire mill for the manufacture of aluminium wire and cables.

---

* *The Mineral Industry During 1917*, p. 28.

†While this was probably correct when printed, the Aluminum Company of America is mining bauxite on its properties in British Guiana. Ocean-going vessels ascend the river to the mines, and transport the ore to New Orleans; thence, it is shipped by rail to East St. Louis.

According to *The Mineral Industry During 1917*, the world's production of bauxite for 1913 to 1917 was as follows:—

	1913	1914	1915	1916	1917
	Long tons	Long tons	Long tons	Long tons	Long tons
France	304,314	(a)	(a)	(a)	(a)
United States	210,241	219,318	297,041	425,100	568,690
Great Britain	8,282	8,286	11,723	10,329	14,724
Italy	6,841	3,844	5,807	8,739	(a)
India	1,184	514	876	750	(a)

(a) Statistics not available.

Production

Some notes on the manufacture of aluminium, as carried out by the British Aluminium Company in 1911, are of interest. The allocation of cost* is given as follows:

	Per lb.
Energy	1·12 cents.
Carbon	1·45
Alumina	6·25
General expenses and profits	6·25
	15·07

The following table, which only claims to be approximate, and which refers to the conditions prevailing before the war, is another estimate as to the cost of production.

	Francs per kilogramme	Cents per lb.
35 k.w.h. at 0·7 centimes	0·25	2·19
2 kg. of aluminate at 0·25	0·50	4·38
0·8 kg. electrodes at 0·35	0·28	2·45
0·12 kg. cryolite at 0·40	0·05	0·44
0·05 kg. fluoride at 0·50	0·03	0·26
0·25 working hours at 0·60	0·15	1·31
Sundries	0·15	1·31
	1·35†	12·34

* See p. 59 for New York prices of aluminium, 1913-17.

† *Engineering*, August 30, 1918. The total as given in the original article is as above, but the items of cost, as stated, total 1.41 francs, which is equivalent to 12.89 cents.

"With regard to the consumption of electric energy in the production of aluminium, Faraday's law requires 2,969 ampere-hours per kilogramme [1.347 amp.-hours per pound] of aluminium, and this result is very nearly (95 per cent to 90 per cent) reached in actual production".* In practice, "in order to produce 1 kg. of aluminium as little as †24 k.w.h. [11 k.w.h. per pound] has been employed, but 33 k.w.h. to ‡35 k.w.h. per kilogramme [15 k.w.h. per pound] is considered a satisfactory result".

Mr. J. T. Pattison, sometime in charge of the chemical laboratory of the Aluminium Corporation, Ltd., Wallsend-on-Tyne, states in his *The Manufacture of Aluminium*, p. 12, that the Aluminium Company's furnaces yield 1·75 pounds of aluminium per horse-power day.

The Norwegian Höyang Falls Company is erecting an aluminium factory in the Sognefjord of 20,000 h.p. for an annual production of 4,000 tons; their calculations are based on a cost of production of 1 kroner per kilogramme (11.7 cents per pound) of aluminium, a normal selling price of 1.45 kroner (17 cents per pound) being reckoned upon, which should provide a dividend on the share capital of some 15 per cent, the various items in the way of expenses, etc., having been provided for. The share capital is 15,000,000 kroner (about $3,900,000).

The transportation of raw materials very materially affects the cost of production of aluminium. For instance, the factories in Salindres, France, which have an annual production of some 12,000 tons of oxide of aluminium, require 30,000 tons of bauxite, 6,500 tons of lime and 50,000 tons of coal.

Although it is impossible, at the present moment, to forecast the effect of the war upon many industries, it is clear that the shortage of copper has greatly extended the use of aluminium, and that not merely temporarily. The production has, in consequence, increased, and a number of important aluminium works have been, and are being, started in different countries.

The annual production, in metric tons, of aluminium was distributed amongst the different countries as under:

**Engineering*, p. 219, August 30, 1918

† This would be equivalent to about 600 lb. of aluminium per horse-power year

‡ 33 k.w.h. per kg. is equivalent to 436 lbs. of aluminium per horse-power year, or 35 k.w.h. per kg. is equivalent to 411 lbs. Mr. A. V. Davis, President of the Aluminum Company of America, has stated that one horse-power year will produce 450 lbs., demonstrating that, in their practice, a slightly higher efficiency has been obtained.

	Canada	United States	Great Britain	France	Norway	Italy	Switzerland	Austria-Hungary	Total
1903	.....	3,400[1]	700	1,600	.....	.....	2,500[2]	.....	8,200
1904	.....	3,900[1]	700	1,700	.....	.....	3,000[2]	.....	9,300
1905	.....	4,500[1]	1,000	3,000	.....	.....	3,000[2]	.....	11,500
1906	.....	6,000[1]	1,000	4,000	.....	.....	3,500[2]	.....	14,500
1907	.....	8,000[1]	1,800	6,000	.....	.....	4,000[2]	.....	19,800
1908	.....	6,000[1]	2,000	6,000	.....	600	4,000[2]	.....	18,600
1909	2,800[3]	13,200	2,800	6,000	600	800	5,000[2]	.....	31,200
1910	3,500[3]	16,100	5,000	9,500	900	800	8,000[2]	.....	43,800
1911	2,300[3]	18,000	5,000	10,000	900	800	8,000[2]	.....	45,000
1912	8,300[3]	18,000	7,500	13,000	1,500	800	12,000	.....	61,100
1913	5,916	29,500	10,000	15,000	2,500	874	10,000	5,000	78,790
1914	6,820	40,600	8,000	12,000	2,500	937	10,000	4,000	84,857
1915	8,490	45,000	6,000	7,500	3,500	904	12,500	2,500	86,394
1916	8,500	63,000	4,000	20,000	16,000	1,126	15,000	5,000	112,626
1917	11,800	90,700	6,000	20,000	18,000	7,000	15,000	5,000	173,500

Note—Statistics for 1903–12 from *Metallgesellschaft 1903-1912*, p. 16; for 1913–17, from *Mineral Industry during 1917*, p. 10.

[1] Includes Canada.

[2] Includes Austria-Hungary and Germany.

[3] Exports.

The proportion of the world's production of aluminium in 1913 and 1917, respectively, was: Canada, 7·5 and 6·8 per cent; United States, 37·5 and 52·3 per cent; Great Britain, 12·7 and 3·4 per cent; Switzerland, 12·7 and 8·7 per cent; Austria-Hungary, 6·4 and 2·9 per cent; France 19·0 and 11·5 per cent; Norway 3·2 and 10·4 per cent; Italy, 1·0 and 4·0 per cent. In 1917, the aluminum producing companies of the world had the following output:

	Metric tons	Pounds
Aluminum Co. of America	90,700	200,000,000
Northern Aluminum Co. of Canada	11,800	26,000,000
L'Aluminium Française (France and Norway)	30,000	66,000,000
British Aluminium Co. (Great Britain and Norway)	11,800	24,200,000
Aluminium Industrie Aktiengesellschaft (Switzerland and Austria)	20,000	44,000,000
L'Aluminio Italiano (Italy)	7,000	15,400,000
Höyang Falden Aluminium (Norway)	3,000	6,600,000
	173,500	382,200,000

Canada—The Mineral Industry During 1917 states that the "Northern Aluminum Co., a subsidiary of the Aluminum Company of America, with extensive works at Shawinigan Falls, Que., is the only producer. It is said to use 42,000 kilowatts (56,000 h.p.). Its output is not officially published, but, with the above cited power, it

should be about 14,000 metric tons per year. Statistics published by the Canadian Government show the importation of bauxite and alumina, together, as 87,154 short tons in 1917. The exports of aluminium in ingots and bars are given as 22,324,600 lb., valued at $7,620,953, or 34·1 cts. per lb. The production was greater than this by the amount produced which was consumed in Canada; estimating this as about 3,500,000 lb., we have placed the 1917 production at 26,000,000 lb., which is equal to 14,300* metric tons. This agrees with the 14,000 tons mentioned above as corresponding to the power stated by Mr. H. E. Randall to be used at the Shawinigan plant. The output of the Canadian plant is used chiefly for export to Europe, Japan, etc. Its exports to the United States in 1917 were 1,879,859 lb."

Although all the raw material has to be imported for the production of aluminium in Canada, the industry is of some importance, owing to the cheap hydro-electric power facilities offered by this country, while a large portion of the United States production is obtained with hydro-electric energy exported from Canada. The following table shows the expansion of the industry in Canada since 1905:

ANNUAL IMPORTS OF 'ALUMINA' AND EXPORTS OF ALUMINIUM

Calendar year	Imports of alumina		Exports of aluminium		
			Ingots, bars, etc		Manufactures
	Pounds	Value	Pounds	Value	Value
1905.....	5,360,800	$ 138,765	2,535,386	$ 508,219	$ 1,588
1906.....	8,975,400	239,136	4,521,486	899,113	2,244
1907.....	12,705,300	268,502	5,478,203	1,109,353	1,499
1908.....	1,485,500	29,752	1,713,800	399,785	1,727
1909.....	11,794,100	234,544	6,134,500	918,195	3,453
1910.....	19,464,400	403,283	7,722,400	1,160,242	3,741
1911.....	18,607,200	372,009	4,990,100	747,587	1,555
1912.....	22,400,500	448,061	18,285,700	2,002,363	10,898
1913.....	30,704,200	614,713	13,015,000	1,762,214	8,203
1914.....	28,557,000	571,419	14,510,800	2,364,907	5,571
1915.....	35,016,200	892,634	18,680,800	3,333,726	620,562
1916.....	53,819,000	1,114,061	18,425,300	5,201,066	26,780
1917.....	174,307,800	1,866,240	22,324,600	7,620,953	17,165
1918.....	186,442,200	2,071,060	21,616,500	7,223,570	197,673

United States—There are aluminium plants at Niagara Falls, N.Y., Massena, N.Y., Maryville, Tenn., and Badin, N.C., all owned by the Aluminum Company of America, which monopolizes the manufacture of aluminium in Canada and the United States. The capacity of the Badin plant, since its enlargement " has been stated

*An obvious error; 26,000,000 lbs. is equal to 11,800 metric tons.

to be 65,000 k.w., capable of furnishing 23,000 (metric) tons of metal annually." In Tennessee, the Aluminum Co., through a subsidiary company, has developed a water-power plant on the Little Tennessee river. This is the first of a system of seven plants, which, "when completed and put into action, will just about double the aluminium-producing capacity of North America." Seven dams will store water sufficient to produce a constant 450,000 h.p. The investment in this development may be estimated at $40,000,000.

The Boston News Bureau states that, commencing with $1,000-000 authorized capital in 1889, the Aluminum Co. of America increased its capitalization to $3,800,000 in 1905 and to $20,000,000 in 1909. In 1916, it paid a dividend of 10 per cent. "As a matter of fact, the company has invested about $70,000,000 of undivided profits in its business; its present investment in plant is over $80,000,000. The market value of its $20,000,000 stock is probably $150,000,000."*

Great Britain—The British Aluminium Co. has two plants in Great Britain and two subsidiary reduction plants in Norway. When war broke out, it suspended work on the development of a water-power and a reduction plant in Switzerland. Extensions of its British plants are under construction and plans are on foot to increase its Norwegian plants. Profits in 1917 were £347,474 ($1,737,000) out of which 6 per cent dividend was paid on the preferred shares and 10 per cent on the common.

The Aluminium Corporation has one plant in Great Britain.

The price of aluminium in Great Britain in 1917 was fixed at 48.8 cents per lb.

France—There are plants with an aggregate capacity of about 100,000 h.p., *viz.*: Société Electrometallurgique Française, with factories at La Praz and at Gardannes; and the Compagnie des Produits Chimiques d'Alais, with factories at Calypso, St. Félix de Maurienne, St. Jean de Maurienne, Auzat and Chedde.

The French Ministry of Munitions fixed the price of aluminium in France for 1917 at 4 francs per kilo (32·7 cts. per lb.), but, on Oct. 1, increased it to 6 francs (50·9 cts.).

Switzerland—The Aluminium Industrie Aktiengesellschaft, Neuhausen, Switzerland, controls factories with an aggregate capacity of 100,000 h.p., *viz.*, one at Neuhausen, Switzerland, one at Rheinfelden, Germany, and one at Lend-Gastein, Austria, also at Crippis-Borgne. Its net profits in 1917 were 19,810,000 frs. A dividend of 20 per cent was paid on the 35,000,000 frs. capital stock, the 8,750,000 frs. of the capital stock unpaid was paid up and a bonus of 7,000,000 frs. in new shares was divided among the stockholders.

**The Mineral Industry During 1917, p. 13.*

Norway—The capacity of the Norwegian aluminium plants is as follows: Arendal, 5,000 tons; Tyssedal, 6,000 tons; Vigeland, 2,000 tons; Stangfjord, 600 tons; Höyang, 4,000 tons. Total, 17,600 tons. *Mineral Industry* states that "the present Norwegian production is probably 18,000 to 20,000 tons per year," but exact figures are not available.

Italy—Three companies, the Villeneuve et Borgofranco, the Tresfilieres du Havre and the Trafilierie et Lamanitoi di Metalli are combined into the L'Aluminio Italiano, with a capital of 20,000,000 lire ($5,000,000).

The countries which have exported most aluminium are France and Switzerland. Prior to the war, each exported 7,000 tons to 8,000 tons per annum. Germany has been the largest importer of aluminium—16,000 tons in 1912 and 12,500 tons in 1913. It is very difficult to obtain reliable information about the production of aluminium during the war; prices have risen abnormally, and new factories have been started which have secured contracts extending over several years after the conclusion of peace.

Conditions of 1915 were favourable to the United States branch of the aluminium industry. In 1914, the United States produced about 48 per cent of the world's production; in 1915, probably over 50 per cent; and, in 1917, 52.3 per cent. In 1917, Canada produced 6.8 per cent of the world's production. Or, expressing it in another way, Canada and the United States, combined, produced one and one-half times as much aluminium as the rest of the world.

Provided the projected factories are built and operated, the production of aluminium is soon likely to be largely increased. If the alumina factories can increase their output, an annual production of some 200,000 tons of aluminium may then be reckoned upon.

It is estimated that, of this aggregate, 50 per cent is likely to be produced in the United States and Canada, 8 per cent in Great Britain (11 per cent before the war), 13 per cent in France ($26\frac{1}{2}$ per cent before the war), 11 per cent in Norway ($2\frac{1}{4}$ per cent before the war), $4\frac{1}{2}$ per cent in Italy ($1\frac{1}{4}$ per cent before the war), and 13 per cent in Switzerland, Germany and Austria-Hungary.

This estimate has recently been made by a "French expert, from which fact it would appear that the French themselves are prepared to lose their lead in the production of what has been called the French metal. The French, however, have not been idle, but propose to meet the increased foreign competition by starting branch factories in different parts of the world. France is therefore likely to maintain its financial position in the world's aluminium industry for years to come. The French obtained what may be called a privileged

position, apart from their bauxite deposits, chiefly through their early developed chemical and electro-chemical aluminium industry, which not only aimed at producing but at finding fresh uses for this new and untried metal."*

Value and Prices

As a result of the requirements for war purposes, up to the date of the armistice, the demand greatly exceeded the supply. The principal use was in the manufacture of a high explosive called 'ammonal', a mixture of ammonium nitrate and powdered aluminium. Large quantities were required for the frame-work of airships, aeroplanes, certain parts of machine guns, the points of rifle bullets, etc. As a result of this demand, the price of aluminium has been affected to a much greater extent than most other metals. The rapid rise in prices occurred in 1915 as shown by the following:

AVERAGE PRICES OF CERTAIN METALS, 1895–1919, AT NEW YORK[1]

Year	Copper, electrolytic	Lead	Tin	Aluminium	Silver
	Cents per lb.	Cents per lb.	Cents per lb.	Cents per lb.	Cents per oz.
1895	10·8[2]	3·2	14·1	58·7	65·3
1896	10·9[2]	3·0	13·3	50·8	67·1
1897	11·3[2]	3·6	13·7	39·0	59·8
1898	12·0[2]	3·8	15·7	30·6	58·3
1899	16·7	4·5	25·1	32·7	59·6
1900	16·2	4·4	29·9	32·7	61·3
1901	16·1	4·3	26·7	33·0	59·0
1902	11·6	4·1	26·8	33·0	52·2
1903	13·2	4·2	28·1	33·0	53·6
1904	12·8	4·3	28·0	35·0	57·2
1905	15·6	4·7	31·4	35·0	60·4
1906	19·3	5·7	39·8	35·8	66·8
1907	20·0	5·3	38·2	45·0	65·3
1908	13·2	4·2	29·5	28·7	52·9
1909	13·0	4·3	29·7	22·0	51·5
1910	12·7	4·4	34·1	22·3	53·5
1911	12·4	4·4	42·3	20·1	53·3
1912	16·3	4·5	46·1	22·0	60·8
1913	15·3	4·4	44·3	23·6	59·8
1914	13·6	3·9	34·3	18·6	54·8
1915	17·3	4·7	38·6	34·0	49·7
1916	27·2	6·9	43·5	60·7	65·7
1917	27·2	8·8	61·8	51·6	81·4
1918	24·6[3]	7·4	**	33·5[5]	96·8
1919[4]	16·6	5·2	72·5	33·0	109·4

[1] *Engineering and Mining Journal*, Feb. 22, 1919, p. 352.
[2] Prices 1895 to 1898 are for Lake copper.
[3] Average of 11 months, no quotations being made in December.
[4] The prices quoted for 1919, are current prices for June 4, 1919.
[5] Official price.
** No average computed.

* *Engineering*, August 30, 1918, p. 219.
† *Engineering and Mining Journal*, quotations in annual review numbers.

In 1854, aluminium sold at £120,000 per ton; in 1856, at £14,400 per ton; 1858-85, at £4,800; in 1886, at £3,400 per ton; at the end of 1890, the price had declined to £720; at the end of 1891, to £240; in 1900, it sold at £86; in 1910, at £62.

The great fall in price followed the decline in the price of sodium from 2,000 francs to 15 francs per kilogramme. Prior to the war, aluminium had dropped to £60 per ton and had become one of the cheaper metals. Comparison of the foregoing with the prices of metals quoted on page 65 shows that, owing to the protective tariff, the price of aluminium in the United States is higher than in Great Britain.

Used in Transmission Lines

Certain properties of aluminium tend to bring it in keen competition with copper for the construction of electric transmission lines; the economic question based on the relative prices of the two metals is the principal determining factor in choosing between the two.

Aluminium is very light (2·7 against 8·9 for copper); it has a very fair conducting capacity (34 against 57 for copper), and it has relatively satisfactory strength (22 against 44 for copper). To obtain the same total conducting capacity, only half the weight of aluminium is required as compared with copper. Consequently, compared by weight, aluminium may be said to have twice the conducting capacity of copper. As, however, even the half weight of aluminium has a larger volume than the corresponding quantity of copper, the cooling of an open-air aluminium line is more effective than that of a copper line. An aluminium line has also the advantage as regards the stress caused by its own weight, but it is at a disadvantage as regards wind pressure and accumulation of snow.

One of the reasons why aluminium has not been more extensively used on transmission lines in the United States, is given in the following editorial in the *Electrical World**:

"As is well known to our readers, the American price for aluminium is deliberately set by the powers that rule it at a figure which just fails to encourage the very large use of the metal in preference to copper. Under ordinary conditions an aluminium conductor at American prices is just a few per cent cheaper than the equivalent copper conductor, so little cheaper, in fact, that the extra cost of supports and stringing the aluminium equals the saving. In Europe and in Canada the ordinary quotations of aluminium are about the same, pound for pound, as copper at the base price, and for hard-drawn wire the saving in the use of aluminium figures out at from 35 to 40 per cent. This difference in condition is established by a virtual monopoly of aluminium in this country, with the usual effect

* *Electrical World*, New York, July 6, 1912.

on the duty, which has been kept just high enough to block importations. As a result of this, the transmission line outside of the United States is more than likely to be constructed of aluminium, while, inside our tariff wall, copper has to be the chief reliance.

"One of the interesting minor advantages of aluminium for the very high voltages as found on some of the Canadian lines is that, owing to its larger cross-section for the same conductivity, the tendency to coronal loss is somewhat reduced."

Another article in the same issue states:

"For the last eight or ten months the average market quotations in the United States for the two metals have been: aluminium 21 cents per pound, and copper 13 cents per pound. The expenses for drawing into wire are, of course, larger per pound for aluminium than for copper, and the average normal cost of hard-drawn wire may be taken as 27 cents per pound for the former and 15 cents per pound for the latter." On the basis of these prices, the weight of aluminium for the same line capacity being one-half that of copper, "it will be found by simple arithmetic that any bare aluminium conductor will cost 10 per cent less than the equivalent copper conductor. Although several aluminium lines have been erected in the United States, it is found, in general, that the comparatively small saving is largely offset by the increased height and cost of the towers for the aluminium line, and consequently there is little inducement for the American engineer to adopt the new metal. Matters are somewhat different, however, in Europe and Canada.

"The United States, European, and Canadian quotations for copper are practically identical, and may be taken at present at 12·5 cents per pound. The European and Canadian quotation for aluminium, however, is only 13 cents per pound as against 21 cents in the United States. In these countries, therefore, the prices for hard-drawn wire are approximately 19 cents and 15 cents per pound for aluminium and copper respectively, with the result that the substitution of aluminium for copper effects a saving of over 36 per cent."

In 1913, during tariff hearings before the Committee on Ways and Means, U. S. House of Representatives, Mr. J. P. Bartlett asked that aluminium be placed on the free list. In his brief, the aluminium industry was declared to be practically in the hands of one concern, the Aluminum Company of America, which controls substantially all the sources of aluminium in the United States. The company was also charged with oppressive commercial methods and practices, as evidenced by the suit filed against it by the Federal Government and the decree entered. He offered the following statement in reference to the Aluminum Company of America's capitalization and profits:—

"That company, starting with a capital of $20,000, increased it to $1,000,000, of which, according to said petition, an additional $10,000 was paid for in cash, $250,000 was to be paid as called for,

and $720,000 was the estimated value of certain patents, and that its estimated assets were $27,000,000, representing (with a possible exception of $1,000,000) earnings and including a stock dividend of 500 per cent, or $16,000,000, declared Dec. 15, 1909, besides cash dividends often declared, those in 1910 admittedly being 17 per cent on said $27,000,000."

He further stated that "the company, through its subsidiaries, is . . . also the largest consumer of aluminium, discriminating in favour of its own users against outside purchasers; large bauxite deposits, the chief raw material in aluminium production, exist abroad and large manufacturers of aluminium in bulk are also situated there. By placing aluminium on the free list, a large stimulus will be given to the manufacture of aluminium products at home."

The Aluminum Company of America filed a somewhat extended statement in defence of its operations and the duty of 7 cents per pound. They said:—

"The mineral bauxite is found in Arkansas, Georgia, Alabama, and Tennessee. It requires 6 tons each of bauxite, coal, and limestone to make 2 tons of alumina, from which 1 ton of aluminium is made. Alumina is made at East St. Louis, Ill., the point of minimum freight haul for the raw materials. Carbon made from petroleum coke is another important raw material employed. Next to labour, electrical energy is the chief requirement in making aluminium, and the company has large electric smelting plants on the Niagara and St. Lawrence rivers, and is commencing another plant on the Little Tennessee river.

"The reduction process is slow and complicated and requires a large investment. While bauxite is plentiful and has a market value of $5 per ton, aluminium, in the form of ingot, sheet, or wire, has a market value of $400 per ton, owing to labour requirements and the large investment, which amounts to $1,500 per ton of product turned out annually. Even the interest amounts to $4\frac{1}{2}$ cents per pound. Petroleum coke is worth about $5 per ton, but the finished carbons cost about $50 per ton. The smelting process is continuous, requiring three daily shifts. Domestic labour is considerably more expensive than the labour obtainable abroad. Freight hauls on raw materials are also much longer in this country than abroad.

"Outside of the United States there are fourteen companies manufacturing aluminium, with a capacity of over 100,000,000 lb. per annum, although the foreign consumption in 1911 was but 55 per cent of capacity. Importations to this country (United States) have been as follows, in round figures: 1909, 5,140,000 lb.; 1910, 12,340,000 lb.; 1911, 7,690,000 lb.; 1912, at rate of 18,750,000 lb. There have been no exports of aluminium produced at home, but there have been some exports of partly or completely fabricated products made from imported ingots."

The company asked that the present duty be retained. It also stated that it is not a merger or combination, but has built up up its own property and business.

War prices seem to have further discouraged the use of aluminium in the United States for transmission line construction. A comparison in prices of the two metals, copper and aluminium (see page 59) explains why. Several United States transmission companies even went so far as to replace already existing aluminium lines with copper for economic reasons. The following are notable examples:

Rochester (N.Y.) Railway and Light Co. "Arrangements have been made by the Rochester (N.Y.) Railway and Light Company to substitute No. 0 stranded copper wire for the 428,000-circ. mil. stranded aluminium conductors of a duplicate three-phase transmission line between Mortimer, N.Y., and the city of Rochester." The aluminium transmission line was built in 1907 and designed to transmit 18,000 h.p. This capacity has been reduced by the change in conductors to about 12,000 h.p., which is considered sufficient for future service. With the price of aluminium at 56 cents per pound and copper at 20 cents per pound—the basis on which the substitution was made—a net amount of $8,400 has been realized from 63,000 pounds of aluminium through the change.*

Northern California Power Co.—"On account of the present abnormally high price of aluminium, and also because it has deemed it advisable to increase the capacity of certain of its transmission lines, the Northern California Power Company, Consolidated, of San Francisco, has taken down some of its aluminium wire and substituted therefor copper wire. The proceeds from the aluminium wire taken down have been sufficient to cover the cost of copper wire of greater capacity together with the labour and other costs involved. The company has made this change from aluminium to copper wire on its high-tension lines between Hamilton City and Nord, a distance of about 9 miles, and between Hamilton City and Chico, a distance of about 13 miles. It is at present engaged in making a similar change from Hamilton City toward Butte City, a distance of about 20 miles, and, as soon as this is finished, it will change the line from Orland northerly, a distance of about 30 miles."†

Montana Power Co.—"Recently advantage has been taken of the high price of aluminium by the Montana Power Company in the reconstruction of transmission lines from its power stations on the Madison river to Butte. Originally three 50,000-volt lines were constructed between these points, two of them using aluminium conductors on wood poles and one No. 0 copper on steel towers. The steel tower copper line has been re-insulated for 100,000 volts

* *Electrical World*, Dec. 25, 1915.
† *Electrical World*, Feb. 19, 1916.

and the aluminium lines abandoned. General Manager F. M. Kerr of the Montana Power Company gives the cost of re-insulating the 60 miles of tower line as approximately $17,000, with a salvage on aluminium from the other two lines at 52 cents a pound f.o b. Butte railway station, of approximately $60,000."*

Respecting the proportion of aluminium and copper used in high tension lines,—70,000 volts and over—data compiled from a tabular statement in the *Electrical World*† show that, in 1914, North America had some 7,000 wire-miles of aluminium against some 19,000 wire-miles of copper in use on lines operating above this voltage. In other parts of the world, the table shows no aluminium used on lines of over 70,000 volts. This is partly owing to the fact that there are comparatively few lines outside of America operating under these higher voltages, but aluminium is also extensively used on the shorter lines found there, notably in Norway, Sweden and New Zealand.

Canada probably has in use a greater proportion of aluminium lines than any other country. A recent survey by the Commission of Conservation shows that on all lines in the Dominion, operating at 10,000 volts and over, there are 13,000 wire-miles of aluminium and 8,000 wire-miles of copper.

---

* *Electrical World*, Feb. 24, 1917.
† *Electrical World*, April 25, 1914.

APPENDIX II

Order in Council, 2nd September, 1918, *re* Application of St. Lawrence River Power Co.

P. C. 2144—*Certified copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 2nd September, 1918.*

The Committee of the Privy Council have had before them a report, dated 31st August, 1918, from the Right Honourable Sir George E. Foster, Acting Secretary of State for External Affairs, submitting that there has recently been before the International Joint Commission an application of the St. Lawrence River Power Company, a corporation of the state of New York, for the approval of a project to construct certain works in the South Sault channel of the St. Lawrence river, an international navigable boundary water; that, as a result of this proceeding, a situation has arisen that may seriously affect Canadian interests; and that, for the reasons set out in the Memorandum hereto annexed, it is desirable that the whole matter should be made the subject of direct discussion and settlement with the Government of the United States.

The Minister, therefore, recommends that representatives of this Government be delegated and empowered to approach the United States Government, through the appropriate channel, and to enter into negotiations upon the matter with representatives of that Government upon the basis of the annexed memorandum.

The Committee concur in the foregoing recommendation and submit the same for approval.

RODOLPHE BOUDREAU
Clerk of the Privy Council

MEMORANDUM

The St. Lawrence River Power Company, a corporation of the state of New York, has made, under what is conceived to be the authority of the Treaty of January 11, 1909, between the United States and His Majesty the King, an application to the International Joint Commission for the approval of a project to construct a submerged weir in the South Sault channel of the St. Lawrence river. The South Sault channel is an international boundary water, and the Governments of Canada and the United States having appeared by counsel in the proceeding and the hearing thereon, certain questions have arisen that affect not only the treaty relations between Canada and the United States and the powers of the International Joint Commission, but also the prosecution of the European war. For the reasons hereinafter indicated, it appears desirable that the matter should be made immediately the subject of direct consultation and negotiation between the two Governments.

The position, as reported by counsel for the Canadian Government, may be here summarized. In September, 1917, the St. Law-

rence River Power Company applied for and secured permission from the Secretary of War of the United States to undertake certain works in the South Sault channel, namely, to dredge a channel through what is known as Dodge shoal, to construct a moveable ice boom and to extend to Long Sault island, by means of a submerged weir, the jetty or deflecting dyke already existing in the South Sault channel. It was stated that the object in view was, through the effect of these works on the river ice formations, to secure during the winter season an increased development of hydro-electric power in the company's power plant at Massena, New York, which is dependent for its operation upon a diversion of the waters of the St. Lawrence river. The construction of the submerged weir was only permitted by the Secretary of War subject to the approval of the International Joint Commission; the other works, however, were approved, without the knowledge of the Canadian Government and without any reference to the Commission, and have in whole or in part been proceeded with.

Although the immediate completion of all these works has been represented as being highly desirable and even urgently necessary, almost a year was allowed to elapse before the St. Lawrence River Power Company took steps to fulfil the condition imposed by the Secretary of War in respect of the proposed submerged weir; it was not until August 9, 1918, that the company's plans and application for approval thereof were filed at the offices of the International Joint Commission at Washington. Thereafter, on August 12, before any notice of the application had been formally served upon the Canadian Government, counsel for the United States Government presented a motion before the International Joint Commission in the course of a hearing upon another matter, praying that the hearing on the application should proceed at that session, notwithstanding the Commission's rules of procedure, which require notice and publication of the application and provide for a considerable period for the filing of counter statements. In support of his motion, counsel represented on behalf of the United States that the St. Lawrence River Power Company was supplying the electrical power essential to its parent corporation, the Aluminum Company of America, one of the world's chief producers of aluminium; that the proposed works would result in an increased production of aluminium during the coming winter months estimated at six million pounds; and that this increased production was urgently necessary for the purposes of the Government of the United States and the Allies in the prosecution of the war. Counsel, therefore, urged that it should be made possible to hold an immediate hearing on the merits of the application.

Counsel for the Canadian Government, having had no opportunity to secure instructions, opposed the motion, declaring at the same time the readiness of his Government to co-operate in all necessary war measures and urging that the matter was more properly one for direct consultation between the Governments.

After consideration, the International Joint Commission ordered the suspension of the rules and fixed the hearing of the application for August 29 at Montreal.

At the hearing at Montreal counsel for the United States, for the first time, came forward with a definite request that the application should be granted forthwith as an urgent war measure, and presented in support thereof a letter from the Secretary of War of the United States. Counsel for Canada submitted, and argued in support of, a statement presented to the Commission, copy of which is attached hereto. It was contended that, under existing treaties, the Commission was without power to grant the approval sought; and the suggestion was repeated that, in any case, the proper and more expeditious procedure was that of direct negotiation between the two Governments, and the Government of Canada was prepared to enter upon such negotiation immediately.

The International Joint Commission has taken the application under advisement until September 12, when it is possible, though, of course, not certain, that a decision may be announced. It was urged at the hearing that, unless the proposed work was commenced before September 15, there would be a risk that it could not be finished before the winter.

Having regard both for the necessity of securing the most effective prosecution of the war and for the great desirability of a wise regulation of the boundary water system between Canada and the United States, it is believed that the procedure pursued in this matter is not calculated to result in a mutually satisfactory solution. The Government of Canada is strongly convinced that some other and more direct means of settlement should be sought; and in this conviction it submits the following considerations and suggestions:—

1. Article VII of the Webster-Ashburton Treaty of 1842 declares "that the channels of the river St. Lawrence on both sides of Long Sault islands and of Barnhart island * * shall be equally free and open to the ships, vessels and boats of both parties." This declaration, relating as it does specifically to the South Sault channel, clearly prohibits the construction of the proposed submerged weir, which admittedly would prevent all navigation through this channel. So far as the Treaty of January 11, 1909, goes to the question, it is equally conclusive against the project. Article VIII lays down an order of precedence to be observed among the various uses for boundary waters enumerated therein, and declares that "no use shall be permitted which tends materially to conflict with or restrain any other use which is given in preference over it in this order of precedence." In the order of precedence that follows "uses for navigation" are given preference over "uses for power and for irrigation purposes." The construction of the proposed submerged weir is sought purely for power purposes, and, as such, it must be held to be prohibited by Article VIII, since it would not only "tend materially to conflict with or restrain" but it would wholly prevent the use of this channel of the St. Lawrence river for navigation. Clearly, therefore, the International Joint Commission is without power to approve the proposed structure, and it is apparent that the application, if pressed as at present, must fail.

2. It is true that the project in question might have been put forward in such a manner that it could properly have become the

subject of inquiry and recommendation by the International Joint Commission. In the turn which the proceeding actually took, the United States Government became in effect the real party; the case became in substance a United States Government matter. Such a case might properly have been referred to the International Joint Commission for inquiry and report under Article IX of the Treaty of January 11, 1909; for it is under this Article that governmental matters or projects should be submitted to and considered by the Commission. It need only be added here that the Government of Canada was prepared from the beginning to entertain such a course and to assist in every possible way in carrying it out.

3. As already intimated, the Canadian Government is not unmindful of the considerations of urgency advanced in this matter on behalf of the Government of the United States; it is not only ready, but is very anxious to do everything in its power to promote in every sphere of endeavour the most effective and harmonious co-operation in the prosecution of the war, in which the two Governments are associated under common ideals against a common foe.

4. For this great purpose the Canadian Government recognizes that, in view of the near approach of the winter season, it is highly desirable that a speedy conclusion should be reached upon the question of the necessity for the construction of the proposed works in the South Sault channel. To this end the Canadian Government would suggest that the whole matter should be withdrawn from the purview of the International Joint Commission and be made immediately the subject of diplomatic negotiation between the two Governments. This suggestion is advanced in the belief not only that it will, if accepted, conduce to a speedy conclusion of the matter, but that it is more appropriate that all proposed measures of co-operation in respect of the war should be discussed in this manner rather than through the medium of the International Joint Commission. In the view of the Canadian Government it was never contemplated that the machinery of this Commission should be used for the settlement of such unusual executive measures as present themselves to the two Governments in the extraordinary emergency that confronts them to-day; rather the Commission was designed to promote, for permanent and comprehensive application, the establishment of a system of principles under which a great natural highway, common to the two countries, might be wisely and deliberately developed for the common benefit. The circumstances in which the present matter has been brought forward and heard need only be recalled to show how little calculated they are to afford to the Commission the opportunity for careful and fully informed consideration that is so essential to the fulfilment of the Commission's real purpose.

5. If, therefore, the United States Government still considers that the proposed works ought to be constructed as a war measure, the Government of Canada is prepared to enter into immediate discussion upon the matter, and to that end it would propose the following as a basis:—

(*a*) If the Government of the United States is satisfied that, unless the proposed works are constructed in the South

Sault channel, there must necessarily be a substantial shortage in the supply of aluminium for the purposes of the United States and the Allies in the prosecution of the war, the Government of Canada will assent to the proposed construction as a war measure. In pursuance of this undertaking, the present application of the St. Lawrence River Power Company to the International Joint Commission should be withdrawn.

(*b*) The terms upon which the proposed works shall be constructed shall be agreed upon at a conference between representatives of the two Governments delegated and empowered for this purpose.

(*c*) In order that the South Sault channel may be restored to its present status, the terms should include a provision to the effect that the submerged weir, if constructed, shall be removed within twelve months after the conclusion of the European war.

(*d*) There shall not be diverted from the St. Lawrence river by the St. Lawrence River Power Company a greater quantity of water daily than is at present being so diverted. This paragraph is not to be construed as admitting any right on the part of the St. Lawrence River Power Company, or of any other person or corporation, to divert water from the St. Lawrence river.

(*e*) The Canadian Government, being advised that it would be possible to develop some seven hundred thousand horse-power from the waters of the St. Lawrence river in the vicinity of the Long Sault rapids, and recognizing that any such development could only proceed under agreement between the two countries, proposes for consideration that the two Governments should take immediate steps jointly to prepare a scheme looking to such power development in the interests of the two countries. In the light of this possibility the Canadian Government is strongly of the opinion that no permanent project by private interest should be permitted at this time that would prevent or interfere with the carrying out of such a joint programme by the two countries.

6. In conclusion, the Government of Canada earnestly trusts that, by means of such a conference between the two Governments as is here proposed, some mutually satisfactory solution of the matter may be reached; for it would look with grave concern upon any casual or hastily considered project that might have serious results upon the navigability of the great highway that constitutes Canada's main artery of communication and commerce. In this connection the Canadian Government would welcome further information concerning the circumstances and authority under which the dredging of Dodge shoal in the South Sault channel, hereinbefore referred to, was undertaken; for, even although it should appear, as alleged, that this change in the river bed will have no effect upon the navigability of the St. Lawrence river, yet, in the view of this Government, it is highly desirable, in the interest of the establishment of sound principles and rules for the development of the common boundary waters, that such projects of private companies should be submitted

in advance to the International Joint Commission. The Canadian Government, which is advised that this dredging has already had the serious effect of lowering by at least five inches the water at the head of the Cornwall canal, reserves for further attention any rights in respect thereof under existing Treaties.

A similar reservation is made in respect of the proposed ice-boom —the construction of which is apparently contemplated without any consultation with the Canadian Government or reference to the International Joint Commission.

OTTAWA, August 31, 1918.

APPENDIX III

Argument of Hon. Hugh Guthrie,* Solicitor General for the Dominion of Canada

Hon. Mr. GUTHRIE: Representing the Government of Canada in this matter, there is not, in my opinion, very much between us upon the facts, and my submission is that, upon the admitted facts, upon the statement of the case which has been put in by the applicant company, there is no power in the International Joint Commission to approve this order; and, if there were such power, I do not think in their discretion they should approve it.

We rely, of course, in that position, in the first place, upon what we consider our absolute treaty rights. The Treaty of 1842, commonly known as the Ashburton Treaty, is still a treaty in full force and effect. It is the treaty which delimits the boundary lines between Canada and the United States. Of its very nature it is a permanent and binding arrangement, and was reached after a long discussion by the two countries. It is an arrangement which was come to upon consideration—valuable consideration. The preamble of the treaty itself recites that it is an arrangement made with such equivalents and compensations as are deemed just and reasonable. Where Canada yields a point in a particular instance, the United States yields a point in another instance. It is founded, therefore, upon equivalents and compensation. A treaty of that nature must be looked on as a very sacred international bargain which cannot lightly be broken, varied or altered.

Now, Article VII of the Treaty is very explicit in regard to the channel of the St. Lawrence at Long Sault island. Those terms which apply to the Long Sault channels read as follows:

"It is further agreed, that the channels in the river St. Lawrence, on both sides of the Long Sault islands, * * * shall be equally free and open to the ships, vessels, and boats of both parties."

There are three requirements of that section with regard to both of those channels. The first is that they shall be equal, that is, the usage of them. Next, they shall be free, and, next, they shall be open. It is interesting to note just a point in regard to the use of that word "equally." There has been some comment on the use of the word. If I understand rightly the contention of my learned friend, Mr. Koonce, when the matter was before this Commission at Atlantic City, he sought to argue that "equally" meant merely that there shall be no discrimination; that the South branch of the Long Sault might be closed so long as it was closed against all parties, because then there would be an equality of non-user which would satisfy the language of the treaty. I am unable to agree with any such view of plain language, and I am satisfied it would be nothing short of a

*Argument of Hon. H. Guthrie on behalf of the Dominion of Canada at the Hearing before the International Joint Commission of the application of the St. Lawrence River Power Company, Montreal, August 29, 1918.

distortion of words to put such a construction upon it. But the word "equally" has a history. In the original draft of the treaty the word "equally" did not appear, and in other sections of the treaty the word "equally" does not appear with regard to the New Brunswick waters.

Mr. MIGNEAULT: Can you suggest, Mr. Guthrie, why it was put in?

Mr GUTHRIE: Yes, I am going to suggest why it was put in. Would you permit me to proceed, because that is the point I am making. The word "equally" did not appear in the first draft. Now, this is a matter, perhaps, of some slight importance. It is an historical point anyway. In *The Works of Daniel Webster*, published by the well known house of Little, Brown & Company, of Boston, in 1856, we get some light upon the question as to how the word "equally" came to be inserted.

Mr. MIGNEAULT: Will you give me the reference, please?

Mr. GUTHRIE: The reference is to Volume VI of *The Works of Daniel Webster*, published by Little, Brown & Company, of Boston, in 1856, at page 282. The first reference is to a letter written by Lord Ashburton and addressed to the Honourable Daniel Webster on July 16, 1842. In this letter, Lord Ashburton enters a mild protest or suggestion that, under certain circumstances, the passage of a British vessel through the Long Sault channels might be refused, and he suggests:

"We want a clause in our present treaty to say that, for a short distance, namely from the upper end of Upper Long Sault island to the lower end of Barnhart's island, the several channels of the river shall be used in common by the boatmen of the two countries."

Mr. Webster replied to that letter in a communication dated July 27, 1842. From his letter I read the following, at page 284:

" Besides agreeing upon the line of division through which these controverted portions of the boundary pass, you have suggested also as the proposed settlement proceeds upon the ground of compromise and equivalents, that boats belonging to Her Majesty's subjects may pass the falls of the Long Sault, in the St. Lawrence, on either side of the Long Sault islands, and that the passages between the islands lying at or near the junction of the river St. Clair with the lake of that name shall be severally free and open to the vessels of both countries."

Mr. Webster's interest was in the Detroit river. It happened that, near Detroit, the channel passes through Canadian waters. He saw that, if the clause were [not] made plain and the treatment for both countries made equal, it might afterwards be contended that the important channel at Detroit was wholly in Canadian waters, and that might not accord equal treatment to the ships of the United States. He agreed that the matter shall be straightened out, and, toward the end of his letter, he says:

"It being understood that all the water communications and all the usual portages, along the line from lake Superior to the lake of the Woods, and also Grand portage from the shore of lake Superior to the Pigeon river, as now actually used, shall be free and open to the use of the subjects and citizens of both countries."

At the close of Lord Ashburton's letter of July 29, 1842, he says:

"I should remark, also, that the free use of the navigation of the Long Sault passage on the St. Lawrence must be extended to below Barnhart's island, for the purpose of clearing those rapids."

At page 352 of the same volume, in President Tyler's Message transmitting the Ashburton Treaty to the Senate, it is said:

"So, again, there are several channels or passages, of different degrees of facility and usefulness, between several islands in the river St. Clair, at or near its entry into the lake of that name. In these three cases, the treaty provides that all the several passages and channels shall be free and open to the use of the citizens and subjects of both parties."

After the draft treaty, which is said in this work to be in the handwriting of Mr. Webster, and it had been transmitted by President Tyler to Congress, the word "equally" was inserted, and it is said here in the handwriting of Mr. Webster:* To make plain and clear that the usage and rights of those waters specifically mentioned in Article VII of the treaty should be equally free and equally open to the ships, vessels, and boats of both parties. Mr. Webster's interest being at Detroit rather than in the St. Lawrence, and the interest of Lord Ashburton, according to his original letter, being more particularly in regard to the St. Lawrence and St. Clair rivers.

That is so plain a declaration, in so prominent a document as an international treaty, that I do not see how any tribunal or any court could vary it or set it aside in any way; but, on the contrary, it must be bound by it and give it due effect.

Now, it was suggested in the argument of my learned friend, Mr. Koonce, that perhaps it had been superseded.

Mr. TAWNEY: Before you leave that, may I ask you a question? Do you contend that the word "equally" applies to any right other than that of the right of navigation?

Mr. GUTHRIE: It shall be "equally free and open."

Mr. POWELL: To the ships, vessels and boats?

Mr. GUTHRIE: Yes; to the ships, vessels and boats.

Mr. POWELL: That is a limitation.

Mr. GUTHRIE: For the moment I would think that navigation would be the only thing in their minds. At that time, the development of power would hardly have been present in their minds.

Mr. POWELL: The limitation to navigation means exclusion of everything else.

Mr. GUTHRIE: "Ships, vessels and boats" is as broad a term applying to navigation as I think it could well frame. It would include all the craft that were known at that time.

Mr. MIGNEAULT: It might include the right to fish in these waters?

Mr. GUTHRIE: No; I do not think the free rights to boats would include a fishing right.

*Owing to the defective accoustics of the room in which the hearing was held, this sentence was mis-reported. Mr. Guthrie's statement was about as follows:—

"Before the draft treaty—with the accompanying message, which is stated in this work to have been written by Mr. Webster—had been transmitted by President Tyler to Congress, the word 'equally' was inserted and it is stated here in plain and clear language that the usage and rights of those waters" etc. (Ed.)

Now, it has been suggested that that treaty has, in some way, been superseded by the subsequent treaty under which the International Joint Commission has been established.

Mr. MIGNEAULT: There was a treaty of Washington in, I think, 1871, which refers to the right of navigation.

Mr. GUTHRIE: There is some reference to it but not as affecting this portion of the river.

Mr. POWELL: What section of the treaty of 1871 applies to the navigation of the St. Lawrence river?

Mr. KOONCE: Article XXVI.

Mr. GUTHRIE: That applies to navigation below Cornwall. It does not affect this matter at all. Now, the treaty of 1909 was a treaty, as stated in the preamble, made between the United States of America and the King of Great Britain—" to prevent disputes regarding the use of boundary waters and to settle all questions which are now pending between the United States and the Dominion of Canada involving the rights, obligations, or interests of either in relation to the other or to the inhabitants of the other, along their common frontier, and to make provision for the adjustment and settlement of all such questions as may hereafter arise."

Under that treaty this Commission, under Article VII, was established, and, by Article VIII, the jurisdiction of this Commission was also established. There is nothing in the treaty of 1909 to confer jurisdiction upon this body save what is set out in Article VIII. It is the only article which confers jurisdiction, Article VII being the article which constitutes the body. Article VIII says:

"This International Joint Commission shall have jurisdiction over and shall pass upon all cases involving the use or obstruction or diversion of the waters with respect to which under Articles III and IV of this treaty the approval of this Commission is required, and in passing upon such cases the Commission shall be governed by the following rules and principles * * * ."

Now, there are only two classes of cases which would come before this Commission brought here by private parties. I do not refer to those cases which may be referred to by the Governments. It is clear that this case does not come under Article IV or have any bearing upon Article IV, because that applies only to waters flowing out of national waters. So it must come under Article III if it comes at all. Article III reads as follows:

" It is agreed that, in addition to the uses, obstructions, and diversions heretofore permitted or hereafter provided for by special agreement between the Parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters on the other side of the line, shall be made except by authority of the United States or the Dominion of Canada within their respective jurisdictions and with the approval, as hereinafter provided, of a joint commission, to be known as the International Joint Commission."

That, I take it, means—and I submit that this is a correct meaning of the sentence—that if, in any case, the United States or

the Dominion of Canada seeks to make any change in its own water or waters under its own jurisdiction, they may do so provided they obtain the approval of this Commission; but, in doing so, they must not transgress Article I. Article I says:

"The High Contracting Parties agree that the navigation of all navigable boundary waters shall for ever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels and boats of both countries equally, subject, however, to any laws and regulations of either country, within its own territory, not inconsistent with such privilege of free navigation, and applying equally and without discrimination to the inhabitants, ships, vessels and boats of both countries."

The moment there is interference with what the article calls "privilege of free navigation," then neither country has any jurisdiction in its own international waters, or its own territorial waters, to do any act. Both countries might, if they saw fit, refer such a matter to this Commission under other sections of this treaty. But, until that is done—and it would have to be done by both countries—neither one nor the other can do any act which will be inconsistent with such "privilege of free navigation." That, I submit, makes the old treaty power rights stronger than they were in the original. It does not supersede it in any way. It does not destroy or annul or alter it. But, by Article VIII, it is expressly provided that the foregoing provisions shall not apply to or disturb any existing uses of boundary waters. One of the uses of boundary waters is the use of navigation. That is a use, and it is so described in Article VIII. The three uses that are there permitted, and the priority in which they are permitted, are stated to be, first, " for domestic and sanitary purposes "; second, " uses for navigation, including the service of canals for the purposes of navigation "; and, third, " uses for power and for irrigation ". Navigation is a use and there is an express limitation in Article VIII that the foregoing provision—that is the provision which confers jurisdiction on this Board—shall not apply to or disturb any existing uses; and the existing use that we rely upon in this case is the use of navigation which was conferred on us by the Ashburton Treaty, Article VII of which provides that this particular branch of this particular river shall be kept " free and open to the ships, vessels, and boats ", of both countries.

Mr. TAWNEY: Do you observe in Article I that the limitation there is to navigable boundary waters?

Mr. GUTHRIE: Yes.

Mr. TAWNEY: Do you make any distinction between navigable and non-navigable boundary waters?

Mr. GUTHRIE: I do not make the distinction, but notice that the words "navigable boundary waters" are there, and I submit that any water that is capable of navigation is navigable water. The fact that ships do not ply does not affect the question of whether the water is navigable or not. We have in Canada many rivers and lakes upon which ships never ply. But there is deep water and some day they might be used. Certainly it is abundantly proved by my learned friends themselves that this stream, the South Sault, was

used for commercial purposes. It was used for pleasure boat purposes. It was used for excursion boat purposes. which is a combination of business and pleasure. Until the railway came in there, it was more or less common. It was navigable and it is navigable to-day. But the evidence seems pretty clear that there was very little traffic on it; perhaps none except the motor boats and launches. There were the docks. One of the witnesses said, "There is a wharf at my place; there is another at Dodge shoal, and there is another a little higher up." He also said, "Freight used to come down, but the railways changed all that."

Mr. MAGRATH: Do you think it would be necessary to go both ways to cause it to be navigable?

Mr. GUTHRIE: We can go both ways.

We have in the South Sault an alternative route. I do not say it is the best route. Let us have an ice jam in the North Sault; let us have a gate on one of our locks thrown out of commission; we have the alternative channel, and we do not want it blocked. But there is a larger view of it even than that and the larger view is this: Some day—and I trust soon—there will be a power development and a dam across the North Sault. It has to be an international work, I assume. Then it becomes all the more important to have the South Sault as a navigable channel.

Mr. POWELL: That is an argument addressed to our discretion.

Mr. GUTHRIE: Yes; I am only pointing out the importance of it in this. I am not yielding a point in regard to our rights under the treaty. Now, my information is that the Government has in contemplation the construction of a dam across that North Branch. It will have to be undertaken internationally, I assume, with the concurrence of the United States. Probably it may be referred to your Commission for settlement. But, if such a work is undertaken, and the North channel is closed, the South channel becomes all the more important. You may say that the Richelieu and Ontario boats are too large to come down it now, but all that is required there is a lock to make navigation good. My point, however, is that the water is navigable, and that is so abundantly proved that I do not think I need labour the question.

Mr. POWELL: There is one thing that bothers me, and I think the case is stronger in your favour than you are putting it, because the two High Contracting Parties in their language in the Ashburton Treaty have recognized this very division of the water as navigable and provided for it.

Mr. GUTHRIE: I would not expect for a moment that I could put it in language as strong as the treaty. I am relying on the treaty but I am trying to point out some of the reasons for the great importance of this question to the Government of Canada. The thing that is also important and should not be lost sight of is this: That this very concern, this Aluminum Company of America, with one of its subsidiary companies, known as the Long Sault Development Company, attempted the very thing that the Government wants to do. They tried to get the right to build a dam across there and they did

get the right from the State of New York, but, subsequently, that right was taken away by the State of New York and the matter got to the courts and to the Supreme Court of the United States.

When the Long Sault Development Company got its charter to construct that dam it was a very broad one. They set out that "the rights hereby granted shall never be so used as to impair or obstruct the navigation of the St. Lawrence river, but, on the contrary, that such navigation shall be preserved in as good condition as, if not better than, the same is at present, regard being always had to the amount of the natural flow of water in said river as affecting its navigability from time to time."

Now, New York State undertook to grant lands under the South Sault to this company. It was held by the United States Supreme Court that they could not do so, but, all through, the Development Company took the position that it was navigable water and they were going to actually improve it. Their charter certainly forbade them injuring the navigation, and I point out also to the Commission that in every permit issued at Washington the navigation of the river has been recognized because the clause has been put in that they must not injure navigation. The three permits contain the clause. The charter the St. Lawrence Power Company obtained from the State of New York has the same clause—they must not injure navigation. The navigation has been recognized. As I said before, though, the matter has been so clearly proven and demonstrated here that I need not argue the question any further.

Now, I go back to the treaty, and, as one of the Commissioners remarked, that is certainly our strongest ground. That is the ground that we rely on as a bar to any action by this Commission in regard to this application. I stated in the beginning that, in the opinion of the Government of Canada, the Commission had no jurisdiction. Whether I used the word "jurisdiction" correctly or not may be open to question, but certainly I am putting it on fair grounds when I say that the Commission has no right to do it. We claim a treaty right. If that Article VII of the Ashburton Treaty does not give the people of this country free and open right to those channels for the ships, vessels and boats of this country, if this Commission has power to close that channel by this dam, it can close the Detroit river; it can close the St. Lawrence river. Where is it going to stop? This Government relies on that treaty. It looks on it as sacred, and it claims its rights under it. Treaties must be respected. The whole world is convulsed with a war now because a nation in a moment of madness undertook to deny treaty rights. We want every right that is given to us under that treaty. For that reason we ask this high tribunal not to seek to vary it, not to deny our right in a single particular, but to keep open and free that channel specifically mentioned in Article VII.

Now, as I said yesterday, the Government of Canada is not disposed to play dog in the manger in this matter. We have no such desire and no such wish. I think it would perhaps have been better if my learned friend, Mr. Koonce, yesterday, had obtained a letter from the Secretary of War directed to the Government at Ottawa

instead of to this Commission, asking that this matter be taken up. I can assure him it would have been taken up and would be yet, and the shortest cut to obtain the relief in this matter is for the Government of the United States—it being the party who should negotiate proceedings—to communicate at the earliest possible moment with the Government of Canada, in order not only that the whole of the greater question may be discussed but that this particular difficulty may be discussed with a view of making it operative and satisfactory for purposes of the present war and at the earliest moment of time. My learned friend suggests that that means delay. They do not want it. The president of their company does not want it. It takes time and can never be done. If the United States wants it done I have authority to say: Let them apply to Canada and the question of delay in adjusting these matters will not be the fault of Canada.

Mr. KOONCE: Will you please state how that can be brought about?

Mr. GUTHRIE: Let the Secretary of War send a telegraphic communication to Sir Robert Borden, and two men can settle this matter in an hour. We are dealing with the Government of the United States and not with a very weighty private corporation, and that is a very grave distinction. I submit to you that, if this dam were to go in and become the property of this private company, it will never come out and that the river will be blocked. I heard it suggested by counsel, "Suppose it were put in and we rip it out at the end of the war." If it goes in it will never come out. The company is too strong. Three or four years from now they will say, "Look at the money we have spent. Leave it there." We want to be in a position of dealing fairly and squarely with the Government of the United States, because we apprehend that this is an international matter. If the two Governments should refer it to this Commission—and I think probably they would refer the greater question to this Commission—all well and good. Your jurisdiction would then be complete, but, in the meantime, my suggestion—I can only make it as a suggestion—is that my learned friend Mr. Koonce should use the telegraph wires and ask his Government to make an intimation—and I am sure that in a few hours it will receive a reply—and, if a commission will come to Canada, or we go to Washington, this particular matter will be dealt with satisfactorily to both Governments, and the lack of production needed for the war will not lie at the door of Canada. My submission, to be very brief, is that, under the language of the Ashburton treaty, Canada has treaty rights which must not be interfered with.

Mr. TAWNEY: Pardon me for asking you one question with reference to the construction of the Webster-Ashburton Treaty. It may have some bearing upon this matter. Was there any protest by Canada or by Great Britain to the diversion from the South channel of the Long Sault of the water of that channel, or any part of it, through the power canal of the St. Lawrence River Power Company at the time that diversion was authorized by the United States Government?

Mr. GUTHRIE: I am not in a position to answer that question, but I was in the House of Commons, as was also a member of your Commission, at the time this question occupied the attention of the House of Commons. That was in the year 1910, after the construction of the canal, and I can tell you that there was a very loud and long protest on that occasion.

Mr. TAWNEY: That had relation, however, primarily, to the development of power in the Long Sault, that is the North channel of the Long Sault.

Mr. GUTHRIE: Yes, sir, it was charged that one led to the other.

Mr. TAWNEY: I wanted to know whether there was any protest, either through diplomatic channels or otherwise, by either Canada or the British Government with regard to the diversion which the Government of the United States authorized from the South channel at the time that diversion was authorized?

Mr. GUTHRIE: I am not in a position to answer the question more than to say this, that I do not think the matter was ever brought to the attention of the Dominion of Canada. That was before the treaty of 1910. It may be that we did not consider that we had any rights at that time.

Mr. TAWNEY: Well, you certainly had your rights under the Webster-Ashburton Treaty, if this was a navigable water.

Mr. GUTHRIE: But the charter of the company says that they were not to interfere with navigation. I suppose that, seeing that before us, if we did see it, we could rely on it, but the fact that they have taken half the water out of that South channel in breach of the terms of that treaty surely does not give them the right to stop it altogether.

Mr. TAWNEY: Not unless the other party acquiesces.

Mr. GUTHRIE: Well, we do not acquiesce; we protest and we protest against the original construction on the ground that they had no proper authority to make that construction. And as vigorously as I can protest I do protest against that and against any further construction.

Mr. POWELL: That word "free" is a technical term.

Mr. GUTHRIE: I find that the word "free" is about the broadest—

Mr. POWELL: It is at once the broadest and the most constricted.

Mr. GUTHRIE: It has such meaning as unfettered, uncontrolled, unhampered, uninterrupted, without let or hindrance. It is as broad a word as you can use.

Mr. POWELL: Are those dictionary meanings?

Mr. GUTHRIE: Yes, but not all of them by any means.

Mr. POWELL: But what about this legal use? By a process of evolution the original meaning of the word "free" has been departed from until it can be more fairly described by saying that it was very restricted. Take the law in respect to the use of the highway. Every individual in the United States or Canada has a right to the free and uninterrupted use of the highway. They have the free and uninterrupted use of a river. At the same time, a man using the highway can back his cart in against the sidewalk as long as he does not unreasonably interfere with the driving of others. A vessel can

anchor in a stream where another vessel may be beating against the wind and have to get out of his way, and that other man has not a free and uninterrupted use.

Mr. GUTHRIE: Yes, he has.

Mr. POWELL: Not in the language of the dictionary. It is a highly technical use of the word "free."

Mr. GUTHRIE: I certainly think that "free" would not permit the building of a dam across the water.

Mr. POWELL: Is not this the case, that the free and uninterrupted navigation of a river would not prevent the owner, if the owner had such a right of soil in the bed of the river, from erecting therein the pier stretching out, so long as it did not unreasonably interfere with navigation, and that question of unreasonable right to navigation will be tried out in a suit for what? For a nuisance. And the thing would be whether it was reasonable or not.

Mr. GUTHRIE: I grant you that all things must be reasonable; otherwise they would be a farce.

Mr. POWELL: If you go back to the Ashburton Treaty, you may restrict the word "free" and adopt it as a highly technical term which does not mean free as given by lexicographers; yet you cannot restrict it to the point of absolute prohibition.

Mr. GUTHRIE: It has been argued that that word "free" means untaxed or without charge, but the word "open" was put in to extend it, and you have both words to deal with. So, if one foot is not on strong ground the other foot is.

Mr. MIGNEAULT: The word "open" with the word "free" shows that navigation should not be restricted.

Mr. POWELL: In the United States there was an island in the centre, and the railway company was building two bridges—the right of free and uninterrupted navigation was invoked, and it came before the Supreme Court of the United States in the way of getting an injunction against the railway company for putting the bridge over one branch of the stream and absolutely closing it. The Supreme Court of the United States held that, inasmuch as there was an ample and sufficiently capacious alternate route, the injunction would not lie.

Mr. GUTHRIE: They did not have a treaty with another nation that said both routes shall be open.

Mr. POWELL: If you had not the Ashburton Treaty the other principle might come in.

Mr. GUTHRIE: I am making no suggestion of that kind at all. We are relying upon the Ashburton Treaty.

APPENDIX IV

INTERNATIONAL JOINT COMMISSION

In the matter of the Application of the St. Lawrence River Power Company for the approval of the construction and maintenance of a submerged weir in the South Channel of the St. Lawrence River near the mouth of its Power Canal at Massena, New York.

INTERIM ORDER

(September 14, 1918)

Whereas, by its application dated July 25, 1918, as subsequently amended with the permission of the Commission, the St. Lawrence River Power Company, a corporation organized under the laws of the state of New York, having its principal office at Massena, New York, applied to this Commission for its approval of the construction and maintenance of a submerged weir in the St. Lawrence river extending from the existing jetty of the said company below the intake of its power canal to Long Sault island in said river and being wholly within the territory of the United States, which construction has been authorized by the United States and approved by a permit of the Secretary of War bearing number 38786/64, dated September 10, 1917, and attached to said application, which said permit contains, among others, the following provisions:—

> "That, if future operations by the United States require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Secretary of War, it shall cause unreasonable obstruction to the free navigation of said water, the permittee will be required, upon due notice from the Secretary of War, to remove or alter the structural work or obstructions caused thereby without expense to the United States so as to render navigation reasonably free, easy and unobstructed; and if, upon the expiration or revocation of this permit, the structure, fill, excavation or other modification of the watercourse hereby authorized shall not be completed, the permittee, at his own expense, and to such extent and in such time and manner as the Secretary of War may require, shall remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the watercourse. No claim shall be made against the United States on account of any such removal or alteration;" and

Whereas, said application was first presented to the Commission at its session at Atlantic City, New Jersey, on August 12, 1918,

whereupon counsel appearing for and on behalf of the United States applied for an immediate hearing on said application, representing, as was also alleged by the applicant, that the said St. Lawrence River Power Company is a subsidiary of the Aluminum Company of America; that the applicant company had for many years developed hydro-electric power in its power house at Massena, N.Y., using water for that purpose taken from the South channel of the St. Lawrence river immediately below Dodge shoal *via* its power canal and Grasse river near Cornwall island; that the hydro-electric power thus produced is used mainly in the production of aluminium by the said Aluminum Company of America; that the demand on this company to supply aluminium is most urgent and insistent, and practically their entire output is being taken by the United States and Allied Governments for military purposes in the prosecution of the present war; that, during the months of January, February, March and part of April in each year, huge ice jams in the said South channel cause practically a shutdown of the said plant and an annual reduction in the output amounting to over six million pounds, and that these serious ice difficulties can be remedied by the construction of the said submerged weir, and counsel for the United States Government therefore applied to the Commission for an order for the suspension of its Rules of Procedure so as to permit of the immediate hearing of the said application and in support of said motion submitted letters from the Chairman of the War Industries Board of the United States and the Acting Director of Aircraft Production urgently praying for favourable consideration and approval of the application herein, and

Whereas, by its order dated at Atlantic City, August 13, 1918, the Commission suspended rules 9, 10, 11, 12 and 13 of its Rules of Procedure and ordered that a hearing on said application be fixed for the 29th day of August, 1918, at 10 a.m. of that day in the city of Montreal, Que., and

Whereas, at the time and place agreed upon, the hearing having taken place, the commission at the conclusion of the evidence of the applicant, heard counsel on its behalf, as well as counsel on behalf of the United States, the Dominion of Canada, the province of Ontario and the state of New York, and also on behalf of several private and corporate interests, no testimony having been presented by either Government or by any interest in opposition to said application, and

Whereas, at the said hearing at Montreal, counsel for the United States presented to the Commission a letter from the Secretary of War of the United States to the Commission, requesting in order to meet the urgent necessity for the increased production of aluminium for the prosecution of the present war, that the permit he had granted to the applicant receive the approval of the Commission, and

Whereas, the Dominion of Canada by its Statement in Response and also at the said hearing denied the jurisdiction of the Commission to entertain and grant the said application, alleging that, under Article VII of the Webster-Ashburton Treaty of August 9, 1842, it is stipulated that the channels in the river St. Lawrence on both sides of Long Sault island and Barnhart island shall be equally free and open

to ships, vessels and boats of both parties, and also that, by the Treaty of January 11, 1909, between Great Britain and the United States, it was agreed that the navigation of all navigable boundary waters shall for ever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels and boats of both countries, and

Whereas, the Commission at Montreal, on the 31st August, having duly considered the said application and the evidence offered in support thereof, and the said exception to its jurisdiction, adjourned its sitting to the 12th day of September at the city of New York, when it continued the consideration thereof on the said and following days, and

Whereas, the Commission is of opinion that the said submerged weir would be an obstruction in a boundary water on the United States side of the boundary line which would alter the level on the Canadian side thereof, and therefore the Commission has, under Articles III and VIII of the Treaty of 1909, full jurisdiction and authority to pass upon the said application, and

Whereas, the Commission is of the opinion that, in order to arrive at a final decision further evidence should be taken and further argument submitted, especially with regard to the effect of Article VII of the Webster-Ashburton Treaty in so far as it may or may not constitute a bar to the construction of the said weir, and with regard to the question of whether said article has been superseded by the Treaty of January 11, 1909, and

Whereas, the war necessities of the Allied Governments imperatively demand that the production of aluminium at the applicant's plant at Massena be increased as much as possible during the winter months, and

Whereas, it further appears that the construction of the said submerged weir must be immediately commenced and be completed by the 15th day of December next in order that the production of aluminium for the present year may be increased;

Therefore, without at the present time finally deciding the question whether the Commission should approve the construction and permanent maintenance of the said weir, and without prejudice in any way to its right to decide such question hereafter, and in view of the pressing necessity for the immediate increase for war purposes of the available supply of aluminium, and at the urgent request of the United States,

It is hereby ordered, as an interim measure, that the construction of the said weir and its maintenance until the expiration of the term of five years from the date hereof, or until the termination of the present war, is hereby approved upon the following conditions:—

(1) That, at the expiration of said period of five years, or upon the termination of the present war, whichever shall last occur, said weir shall be removed by the applicant; reserving, however, to the applicant or any other interested party the right to apply to the Commission at least one year before the expiration of the said period for a further continuance of the said weir, and on such application the Commission may approve of such continuance on such terms and

conditions as it may deem appropriate and equitable for the protection of the rights and interests of the people on either side of the line in accordance with Article VIII of the Treaty of 1909.

(2) That the said weir shall be constructed and maintained in accordance with the plans mentioned and under all the terms and conditions set forth in the paragraphs numbered from 1 to 11, both inclusive, in the permit therefor granted by the Secretary of War, dated September 10, 1917, so far as same are applicable.

(3) That for the purpose of protecting the rights, property and interests on either side of the boundary from any injurious effect resulting from the construction and maintenance of said weir the Commission will, during the term of its approval herein, retain jurisdiction over the subject matter of said application, and may make such further order or orders in the premises as may be necessary.

Provided, that in making the foregoing order the Commission shall not be deemed to have considered nor passed upon any question pertaining to the right of the applicant to divert water from the St. Lawrence river.

Dated at New York, N.Y., September 14, 1918.

C. A. Magrath
O. Gardner
Henry A. Powell
James A. Tawney
P. B. Migneault
R. B. Glenn

APPENDIX V

Order in Council, October 12, 1918, *re* St. Lawrence River Power Company

P. C. 2509—Certified copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 12th October, 1918.

The Committee of the Privy Council have had before them a Report, dated 19th September, 1918, from the Acting Secretary of State for External Affairs, submitting as follows:—

As the result of an application recently made to the International Joint Commission by the St. Lawrence River Power Company, a corporation of the State of New York, for the approval of a project to construct certain works in the South Sault channel of the St. Lawrence river, an International navigable boundary water, a situation arose which gravely concerned Canadian interests; for in the view of this Government, already expressed at length in the order in council of the 2nd September, 1918, (P. C. 2144),* not only was it clear that, since the proposed works would wholly prevent navigation through the South Sault channel, the International Joint Commission was, by reason of existing treaties between His Majesty the King and the United States, without power to sanction the project, but it was further apparent that the project itself was inconsistent with and would seriously impede the best development of the St. Lawrence river for navigation and power purposes in the interest of both countries. It was also the view of this Government that the construction of such works was in no wise necessary for the attainment of the end desired by the St. Lawrence River Power Company, as expressed in their application, but that other effective and wholly unobjectionable means were available for that purpose. Accordingly, it became the duty of the Government to appear formally before the International Joint Commission and to enter its strong objection to any consideration of the application by that tribunal. At the same time it appeared that the Government of the United States has come forward in support of the application and was urging its immediate approval as an urgent war measure.

In those circumstances this Government, with every desire to promote the most effective co-operation in the prosecution of the war, proposed, as will appear from the said order in council of the 2nd September, 1918, that the matter should be withdrawn from the International Joint Commission and discussed directly between the two Governments with a view to securing the immediate accomplishment of the desire and purpose of the United States Government and, at the same time, preserving the position of this country in respect of its treaty rights and its interest in the sound development of the St. Lawrence river for navigation and power purposes. The proposal was indeed calculated to secure this purpose of the United States Government more expeditiously than was possible through the medium of the Commission, even if the Commission had had power to entertain the case.

*See Appendix II, p. 71.

In pursuance of this proposal two members of the Government proceeded to Washington and presented the position in greater detail to the Secretary of State of the United States. It may be added here that the proposal was not at that time accepted, nor has it since been accepted; in fact, no reply thereto has yet been received from the United States Government.

Subsequently, on the 14th September, 1918, the International Joint Commission reached a decision on the application and delivered an order, copy of which is appended hereto, [Appendix IV], approving the construction of the proposed works on certain conditions therein set forth. At the same time, the order reserves for further consideration the question whether under the terms of existing treaties, the Commission has power to approve the proposed structure. It should be added that the Canadian Government, through its counsel, had already, before the issuance of the order, acquainted the Commission with the terms of the order in council of the 2nd September, 1918, setting forth its view that the Commission was without power to make such an order.

It is worthy of note that the Commission, in issuing the order, expressly declines to decide whether it actually has power to do so. In exercising authority it leaves for future determination the controlling question as to whether it possesses any such authority. However, it cannot be doubted that the issuance of the order is in itself an assumption of such authority.

Thus confronted with an assumption of power on the part of the International Joint Commission, which, in the opinion of the law officers of the Crown, was entirely unwarranted, it is necessary to determine at once the course of the Government. A conclusion as to the course to be pursued under such conditions is not without difficulty. It is pertinent, however, to recall that, in a former case, presenting a similar situation, the Government of the United States refused to recognize the jurisdiction of the International Joint Commission. In the matter of the division of the waters of the St. Mary and Milk rivers, then pending before the Commission, it appears, from a despatch from His Majesty's Ambassador at Washington, dated November 13th, 1917, that the United States Secretary of State, by letter dated November 8th, 1917, informed the Ambassador that, since the Commission had under consideration the question of its authority to interpret or construe Article VI of the Treaty of January 11th, 1909, and since, in the view of his Government, the Commission had no such authority in the then state of the case, he had deemed it proper to inform the Commission that whatever conclusion was reached by the Commission could not be regarded as binding upon his Government in so far as it undertook to construe the Article in question.

In view of the foregoing, the Minister recommends that the Government of the United States be informed that this Government feels bound to repeat its view that, for the reasons already indicated, the International Joint Commission was without authority to approve the application of the St. Lawrence River Power Company, and that

the order of the Commission assuming to grant such approval cannot be regarded by the Government of Canada as binding upon this Dominion.

The Government of the United States will readily understand that, in taking this course, the Canadian Government is actuated only by its concern for those treaties and conventions that have so happily promoted the friendly relations between the two countries, and by the belief that it is through a jealous regard for the integrity of such understandings that these fortunate relations may best be maintained.

It is with this purpose also that the Canadian Government deems it appropriate to refer here to the proposal made in the order in council of the 2nd September, 1918, that the two Governments should take immediate steps jointly to prepare and carry out a scheme looking to the most economical and comprehensive development of the waters of the St. Lawrence river in the interests of the people of both countries. Even though the utilization of only a portion of the whole capacity of the river can be immediately contemplated, yet the endeavour should be to design at the outset a complete scheme into which successive developments might be fitted from time to time as and when the occasion might demand. Without some such scheme there is always present the great danger that the ultimate possibilities of St. Lawrence navigation may be neglected or even irreparably injured; for it must be borne in mind, not only that navigation is the paramount national and international use of this great highway of commerce, but that the possibilities of the stream in this respect have been as yet by no means fully developed. On the other hand, it is certain that the subordinate and incidental but important use of these international boundary waters for power purposes can never be rendered as efficient and productive through a policy of simply permitting a haphazard series of unrelated private enterprises as through a carefully considered and comprehensive scheme of development carried out under public auspices by the two countries; and obviously it is only by agreement and concerted action between the two countries that such a development can be undertaken.

But, as already intimated, this is not all; there is, in addition to the economic advantages, the much more important consideration affecting the status of the treaties and conventions between the two countries. For the adoption of the proposed joint project as an international policy would, it is conceived, be calculated to obviate many occasions for public dissatisfaction and misunderstandings that on the one side or the other might otherwise arise from time to time in respect of private exploitations of the uses of these waters. Unquestionably, these uses are becoming more and more regarded as public uses, and it follows that the responsibility for their development should be undertaken, and the benefits of such development enjoyed, by the public. Indeed, for this reason and in view of the other considerations here adduced the Canadian Government is strongly convinced that nothing should be allowed to prejudice the chance of such a comprehensive power development of the St. Lawrence waters, and, so far as its consent may be necessary, it will, therefore, be unable to sanction further private enterprise of this nature.

The Committee concur in the foregoing report and the recommendations therein made, and recommend that Your Excellency may be pleased to transmit a copy hereof immediately to His Majesty's Ambassador at Washington for communication to the Government of the United States, and also that a copy be transmitted to the International Joint Commission.

All which is respectfully submitted for Your Excellency's approval.

RODOLPHE BOUDREAU

Clerk of the Privy Council

Report on Housing, Town Planning and Municipal Government

BY

THOMAS ADAMS

Town Planning Adviser, Commission of Conservation

THE report here presented is simply a summary of the work we have been doing during the past fourteen months, since the last annual meeting of the Commission.

Housing in England

When the last annual meeting was held in November, 1917, I was in England. I am preparing a general report on housing, which will deal, *inter alia*, with the results of investigations in Britain into the question of war housing and reconstruction. During the time I was in England, Mr. F. L. Ackerman was also there on behalf of the American Institute of Architects. It was partly as a result of the report of Mr. Ackerman, on his return to the United States, that Congress was induced to undertake housing schemes, following the lines initiated by Great Britain during the war. The housing schemes of Great Britain, carried out between 1915-18, were intended to fulfil two purposes: (1) To help to increase the output of munitions, by making workers more contented and efficient; and (2) to erect buildings of such a permanent character that they would be a contribution towards reconstruction.

England has proved to herself that it has been a terrible mistake not to meet the cost of getting rid of bad housing conditions and not to pursue more energetically a constructive programme of better housing. This she has realized during the war, notwithstanding that no country in the world appears to have done so much for improving housing conditions by means of government aid.

Nova Scotia

Almost immediately following my return from England, the Halifax disaster took place. I was requested to visit the city, and prepare a report with regard to the reconstruction and planning of the devastated area. A preliminary report was submitted, after several visits, and, subsequently, I prepared a detailed plan of the whole of the devastated area. In this work I was assisted by Mr. H. L. Seymour, who was loaned to us by the Surveyor-General. A short report on the plan

and progress made is appended. The Halifax Relief Commission and the City Council have adopted the schemes prepared on behalf of the Commission.*

I am not able to say anything very definite with regard to the extent to which this plan is being carried out. My latest information on that point is not quite satisfactory. I hesitate to say anything of a critical nature of what is being done in Halifax, but personally I am not satisfied with what has been accomplished. The absence of any expert advice on the Relief Commission itself must be regarded as a matter of extreme disappointment, although, for personal reasons, I was opposed to the suggestion made on behalf of this Commission that I should be made a member of the Relief Commission.

The first steps have also been taken in connection with the preparation of a scheme for the whole city of Halifax, and the first stage of the work is completed. Four schemes have also been carried through the first stage for four areas, comprising over 18,000 acres, in the county of Halifax. All these schemes were started before the termination of the war. Since the armistice was signed, greater public interest has been shown in Nova Scotia, and it may be anticipated that there will be considerable town planning activity in the province in the next two or three years. The *Halifax Herald* is advocating the creation of a Housing Board, and is pressing for an extensive programme of housing construction.

The Civic Improvement League of Halifax has been merged into the Commercial Club of the city, which is making an investigation of the housing problem. I submitted a paper on " Reconstruction in Nova Scotia " at the annual meeting of the Union of Nova Scotia Municipalities.

New Brunswick

The St. John town planning scheme has reached the final stage, but still awaits the approval of the City Council and the Provincial Government. Unfortunately, we will be unable to make this scheme as satisfactory as it should be. One of the objects of the scheme is to fix main arterial thoroughfares around the city. That these may be fixed, it is necessary to have a survey made of the lines and positions of the thoroughfares, and to show these lines precisely on the plan. I have endeavoured to find some means of getting this work done at a small cost of time, but have found it impossible, owing to the absence of an accurate topographical map. Even when the line of the highway is approximately determined on the ground, in a satisfactory position, it is

* Mr. Adams exhibited an outline blueprint of a plan of the devastated area in Halifax, showing the rebuilt area.

impossible to show that line with anything approaching accuracy on the city map which has to be used as the basis for the plan. It is essential, in connection with this and all town planning schemes, that there should be prepared accurate topographical maps of our cities and surroundings, showing the existing buildings and physical features on a scale sufficient to enable new developments to be shown with some approximate relation to what exists. I am taking this matter up with the Government departments in Ottawa concerned with surveys, to see whether it will not be possible to get accurate maps made of the larger cities, as a basis for future town planning schemes.

We have fought against the absence of this information, but have been unable to persuade the Government departments that that was a proper work to be undertaken, during the war at any rate. Only the other day I had a conference with a representative of a city in Ontario and Mr. Ogilvie of the Geodetic Survey, with a view to seeing whether the Government and the cities could not co-operate in getting out these maps. An accurate survey of each city and the territory immediately adjacent to it could be made on a scale of one hundred feet to one inch and used as the basis for preparing maps of smaller scale, which would serve many useful purposes. I may add that in England, after a war, a large proportion of the men who are demobilized, and who have the necessary professional qualifications, are engaged for that kind of work. So far as I know, no definite proposal has been made to utilize the services of returning Canadian engineers in any particular piece of work, even where their old places are not available. These men deserve as well of their country as any other class of men who are returning, and a profitable field of work for them would be to enlarge and increase the topographical information which we possess of the more settled parts of the country.

In New Brunswick, a Department of Health has been formed, and there is a proposal to create a Housing Commission to deal with the administration of the Federal Housing Fund, to which reference is made below.

Prince Edward Island

I have been in consultation with the Premier of Prince Edward Island on two or three occasions during the year, and have paid two visits to the Province. An Act, drafted on behalf of the Commission of Conservation, was submitted to the Legislature of the Island and was passed into law in its last session. Under that Act, it is proposed to form a Development Board for the Province, and one of its first duties will be to formulate a town-planning scheme (in co-operation with myself) for the new town of Port Borden, which will be erected at the Prince Edward Island terminal of the new ferry.

Quebec

I have just returned from Quebec. I met the Provincial Cabinet on Friday, and they consented to certain suggestions which I made with regard to the Housing Act. They have also asked me to submit to Hon. Mr. Taschereau, the Minister of Public Works for the province, a draft Town Planning Act for submission to the ensuing session of the Provincial Legislature. British Columbia is the only other province with no Town Planning Act.

It is hoped and expected that a Town Planning Act will be passed in both Quebec and British Columbia this year, at the same time as the new Housing Acts, which it is proposed to introduce in connection with the Federal Government loan. I am in negotiation with the Ministers who are concerned with the introduction of the legislation.

A plan of the town of Kipawa, which has been prepared on your behalf for the Kipawa Fibre Company, is illustrated and described in an accompanying brief report dealing with that scheme.*

That plan is intended for a population of from 2,000 to 3,000, but it is expected that the town will grow larger and that provision for a larger population will have to be made. The chart shows the position of the mill which is being erected. The whole of the intervening flat land is being used for piling lumber. They selected the best site for the mill; then selected the next best site for piling the lumber, and said: "Now, you find your site for the town." The ordinary lines of the rectangular survey gave us a grade of 18 per cent for the main streets, which was really impossible; so we found a line which gives a 5 per cent grade for the main avenue, with a central square on the only piece of flat land available; then we have 5 and 6 per cent grades as a general rule. Not only did they select the best site for the mill and the piling of the lumber, but after we had prepared this plan they said: "We are going to make a flume, 8 feet in diameter, right through the middle of the town." I had then to adjust the plan so as to deal with the very difficult situation thus created.

The company intends to use permanent materials for a large portion of the houses, including fireproof roofing material on all. They have control of about ten square miles, and they intend to do whatever is necessary to protect that area from fire. Where the houses are comparatively widely separated they have really more protection from fire than would be afforded in the case of cement or brick houses more closely built and without an ample supply of water. There is a good pressure of water.

*Mr. Adams showed the plan of the town of Kipawa, illustrated and described in the report given in Appendix VIII, p. 110.

The first thing after this plan was prepared was to instruct Messrs. Lea, of Montreal, to prepare a plan of the water supply and sewage systems. We then selected an area on which they could start the first portion of these systems. They are proceeding with this town in sections, one block at a time; they do not proceed with sewers or water mains that are not necessary for the immediate development of the town. This year they will put in as many sewers and water mains as they require for the buildings erected and next year they will proceed the same way. That means that the development will proceed evenly and gradually, and therefore very much cheaper than usual, under the ordinary method of subdivision, which creates hundreds of vacant lots producing no revenue.

Special consideration has been given housing problems in Quebec and Montreal, and several meetings have been held. There is a proposal to carry out a large scheme for erecting new houses in Montreal, and I am being consulted by those who are interested in the project.

A Department of Municipal Affairs has been created in the province, a step of importance which, I think, is partly the result of the propaganda of the Commission. The Act is a serious effort to set up an effective piece of machinery to co-ordinate the work of the municipalities.

I am suggesting that Montreal should follow the lead in building a model village, which will be an example to the rest of the country. We will not make much progress in housing until we have made a practical demonstration of what should be done. The average man is not convinced by plans, by addresses, or by reports; he is convinced by what he sees. We should select fifty types of houses, then have them built and shown to the people to illustrate the best ideas in housing and town planning.

Ontario

Much work has been done in Ontario during the past year, and our advice has been sought by municipalities, boards of trade, and other organizations on many subjects connected with town planning and municipal government.

In response to suggestions by municipal organizations, the Ontario Government passed an amended Planning and Development Act. The Act is an advance on the previous Act, but does not go so far as other Town Planning Acts in the Dominion. It is hoped that, in view of the activity which is likely to take place in the future in connection with housing schemes, an effort will be made to further extend and widen the scope of the Ontario Act.

The Bureau of Municipal Affairs is now in operation in the province, and Mr. J. A. Ellis has been appointed to take charge of municipal and housing work. This is a definite and satisfactory step in the direction of creating a Department of Municipal Affairs.

The following plans have been submitted to me for approval and comment during the past year, in all cases involving a visit to the site:

(1) Hawkesbury Garden Village—scheme prepared by Mr. Dunnington-Grubb, for the Riordon Pulp and Paper Co.

(2) Ojibway—scheme of new town prepared for United Steel Corporation.

(3) Hamilton—scheme of development for city, prepared by Mr. N. Cauchon, partly in consultation with Mr. W. F. Tye.

With reference to the plan of the new town of Ojibway, most of the roads are only 50 feet wide. Under the Ontario regulation they should be 66 feet wide. The plan was submitted to me, and I was asked to say whether it was desirable to approve of it. I had a careful estimate made of the width of all the roads, including those over 100 feet wide, and I found that the total space given to roads was greater than if they had all been 66 feet wide. The only difference was that the main arteries were about 150 and 100 feet wide and the secondary roads 50 feet wide. The roads are designed to carry the traffic which will pass over them, and not according to a hard and fast rule.

We have also been consulted regarding plans and other matters connected with town planning and housing at Renfrew, Oshawa, Belleville, London, Chatham, Windsor, etc. It has been impossible to accept many of the invitations to address meetings, owing to the necessity of giving more attention to the technical and organizing work.

The Ontario Government has taken a more advanced step in regard to housing than any other provincial government. It has appointed a strong committee, with Sir John Willison as chairman, to prepare a report on housing, and has appropriated $2,000,000 to be loaned to municipalities at 5 per cent; this in addition to the proposed loan of the Federal Government. Owing to the influenza, two conferences in the province were postponed. Addresses were given at important meetings held at London, Toronto, and other centres.

Manitoba

The Manitoba Government has postponed taking action under its Town Planning Act until the termination of the war. According to recent advice, however, there is likely to be considerable activity in the province in the near future in housing and town planning schemes. We are

at present advising the Provincial Government with regard to its town planning regulations and as to the need for a director of housing and town planning for the province. Manitoba has been very much in the war, and it was difficult during the last four years to arouse public interest in matters of this kind—more so than in some of the other western provinces. There is now a distinctly forward movement in Manitoba on this subject. A member of the Provincial Government has written me that they realize the importance of having a director of housing and town planning for the province. Until we get such a director for each province, we shall not get much effective work done.

Saskatchewan

The Saskatchewan Town Planning Act came into force in July, 1918, regulations have been prepared thereunder, and a provincial town planning director has been appointed. I have conferred with the Ministers and officials interested in the administration of the Act, and have also given advice to the city of Swift Current and addressed meetings in the province.

Alberta

No progress was made under the Alberta Act until this year, although it was passed in 1913. This year definite progress has been made.

About a year ago there was a threat that certain portions of Calgary and Edmonton would be taken out of the city and attached to municipal areas outside. The cities asked for a report on the matter, and, as a result of our recommendations, definite progress has been made. At the request of these cities, I attended conferences and had consultations with the proper officials as to how they could get out of their financial difficulties. It was rather unusual for a city to call in town planning advisers, with a view to decreasing rather than increasing their financial difficulties—the ordinary conception of town planning is that it means further expenditure of money rather than the saving of money. The situation is to be dealt with by the preparation of town planning schemes, designed to save money for those cities. The idea is that the land will be planned in such a way that the money now being wasted on local improvements will be saved in the future by carrying out such improvements as will be required to deal with the growth of the population and not with the extraordinary pictures conceived by real estate owners with vivid imaginations.

The proposed schemes are of great importance, in the nature of their application to the problem of land taxation. I am appending a short memorandum on the subject (Appendix VIII, p. 113).

British Columbia

During the year, I have twice visited British Columbia. On the first occasion, I organized and attended a meeting of the Civic Improvement League at Victoria on July 9–11, in co-operation with the Union of Canadian Municipalities. A brief report is given in Appendix XI, p. 116. I also addressed meetings in Victoria and Vancouver. On the second occasion, I addressed the meeting of the Union of British Columbia Municipalities and advocated the passing of a Town Planning Act for the province. This has since been the subject of negotiations, and it is hoped that an Act will be passed during the present session of Parliament.

Premier Oliver has indicated the intention of his Government to introduce an Act to establish a Department of Municipal Affairs.

Some General Questions

The above is a *résumé* of the work in the different provinces. It is difficult to indicate how extensive is the correspondence, and how much time is involved in travelling and dealing with such a widely scattered territory as we have in Canada. The work in connection with this branch has been gradually increasing during the past year. Communications are received almost daily asking for advice and assistance, and the burden of correspondence has enormously increased. Since the armistice, this has been specially so. Many people, who have previously been giving attention to the war only, are now turning their thoughts to the work of housing and reconstruction generally.

When the Civic Improvement League was formed in 1916, it was impossible to arouse much interest and enthusiasm on the subject of civic improvement. This has gradually diminished, not as a result of any lack of appreciation of the importance of the problem, but because of the more serious aspect of the war during 1917 and 1918. We may now expect restoration of interest in civic improvement matters, and, during the present year, a serious effort must be made to create a permanent organization in the form of a properly constituted Civic Improvement League for Canada.

One feature of interest is the extent to which civic spirit is being introduced into the objects of the chambers of commerce which are being formed in many cities. Reference has been made to this, and other matters which cannot be dealt with in this paper, in *Conservation of Life*.

Federal Housing Loan

The Federal Government has appropriated $25,000,000, to be loaned to the Provincial Governments for housing schemes. In the order in council (Appendix X, p. 121) in which this loan was announced, the Acting Prime

Minister recommended that the Committee of the Privy Council appointed as a Housing Committee should secure the assistance and co-operation of your Town Planning Adviser.

Since December 12, I have been in conference with the Housing Committee, and, under their instructions, have made arrangements with the Commission of Conservation to set up a special office, which is in part the Town Planning and Housing Branch of this Commission and in part the executive branch of administration of the Housing Committee.

The Housing Committee has drawn up a general scheme for the Dominion. This has been approved by the Provincial Governments, and is now being used as the basis of legislation for each province. I am appending a copy of this scheme, as included in the Order in Council of February 18th. There has been a general approval of the scheme of the Federal Government, both in Canada and the United States.

The following observation, by one of the leading firms of architects in New York, may be taken as an example of the favourable comment that has been received:—

"We wish to express our unqualified admiration for the completeness, practicability, and simplicity of the administration methods outlined in the data received from you. We believe this to be the most practicable step toward the provision of good housing by Federal co-operation which has yet been taken in any country."

The recommendations made by the Federal Government should help to avert a certain amount of the fire waste which goes on in connection with houses. The Ontario Government limits the amount which may be spent on a house to $2,500 in general cases and $3,000 in certain cases to be specially approved. In the absence of any restriction as to the kind of building material, the result will inevitably be that cheaper material will be used. In the recommendation of the Dominion Government, it is suggested that for a frame house with brick veneer or frame house with stucco and shingle roof, if the house contain four or five rooms, the loan be for $3,000, and, with the same construction, if there be six or seven rooms, $3,500. If the house be built of brick, stone or concrete with fireproof roofing material, the loan be $4,000 for four or five rooms and $4,500 for six or seven rooms, the period of repayment being increased, if desired, to thirty years instead of twenty, at five per cent. The result will be that every man who wants to build a house of incombustible materials, not only can get a larger sum, but can get it on as small monthly payments as if he built the cheaper house. In other words, a man can get $4,000 for thirty years for about the

same sum payable monthly as the man who builds the cheaper house can get $3,000 for twenty years. While the payments in the case of the larger loan extend over a longer period, the owner has a house of more durable construction. The recommendations also show that the Government is taking a forward step in recommending the adoption of town planning principles in connection with housing schemes and in furthering these measures to secure the best methods of construction.

Literature

Conservation of Life has been published quarterly, containing, for the most part, original articles on various prospects of town planning and housing development in Canada. We have numerous requests for copies of *Conservation of Life* from people in the United States and wide publicity has been given to Canadian effort in promoting town planning and housing by reason of the recommendations that are made in United States circles that the work of Canada in this respect should be copied by the States. In that connection, I have been urged to attend a large number of meetings and give advice to several cities and towns in the United States. It has been necessary for me to refuse these requests, except in a few special cases where I have felt justified in addressing meetings of large and influential organizations for the benefit of our own work.

When visiting British Columbia, I extended my journey as far as Oregon, to give a series of three addresses to a Commonwealth Conference under the auspices of Oregon University. Early in 1918, I spent a week in Washington in conference with the Director of Housing and his town planning experts, making suggestions regarding their housing policy then under consideration. This visit was made at the request of the British Ambassador and on behalf of the United States Minister of Labour.

I also attended the National Conference on City Planning, at St. Louis, in May, 1918, a conference on reconstruction, convened by the National Municipal Bureau, held at Rochester, and a conference at Boston under the auspices of the National Housing Association. At the last two meetings, I was asked to submit suggestions for a programme in connection with the reconstruction policy to be promoted by the above organizations in connection with housing, and gave the opening addresses at both conferences for that purpose.

Conclusion

Owing to the large amount of work that has accumulated during the past year, and which continues to grow, as the result of the educational work of this Commission, I have been unable to complete the two reports in

hand during the past two years—one dealing with housing and the other with urban planning. I am devoting all the time I can spare to the Housing Report, so that it will be ready for publication in the early spring.

In order to save my time in travelling, the Housing Committee has appointed Mr. A. S. Dalzell, A.M.E.I.C., to deal with western provinces, and Mr. H. L. Seymour, D.L.S., A.M.E.I.C., to help me with the eastern provinces in connection with the advice to be given to local authorities and provincial governments, so that I shall be able to give more of my time to office work. Mr. W. D. Cromarty has been appointed as architect to assist in preparing designs for cottages to be recommended to Provincial Governments.

The report on Rural Planning and Development, already published by the Commission, is now issued as a reference textbook in Harvard, Kansas, Washington, and other universities in the United States. Delay in issuing the other reports is partly due to my desire that we should be able to produce something that will not be merely of transitory value in connection with the problem, but that will be of some permanent value as a guide for the future activities in connection with the work of the Commission.

I anticipate great progress in connection with housing and town planning in the Dominion during the coming year. A Town Planning Institute is being formed for the purpose of promoting educational courses on town planning in the Universities. It is unfortunate, if I may say so personally, and quite apart from any reference that may be made to it by others, that at a time like this we should be without the valuable leadership of our chairman, Sir Clifford Sifton.

APPENDIX VI

Planning the Greater Halifax

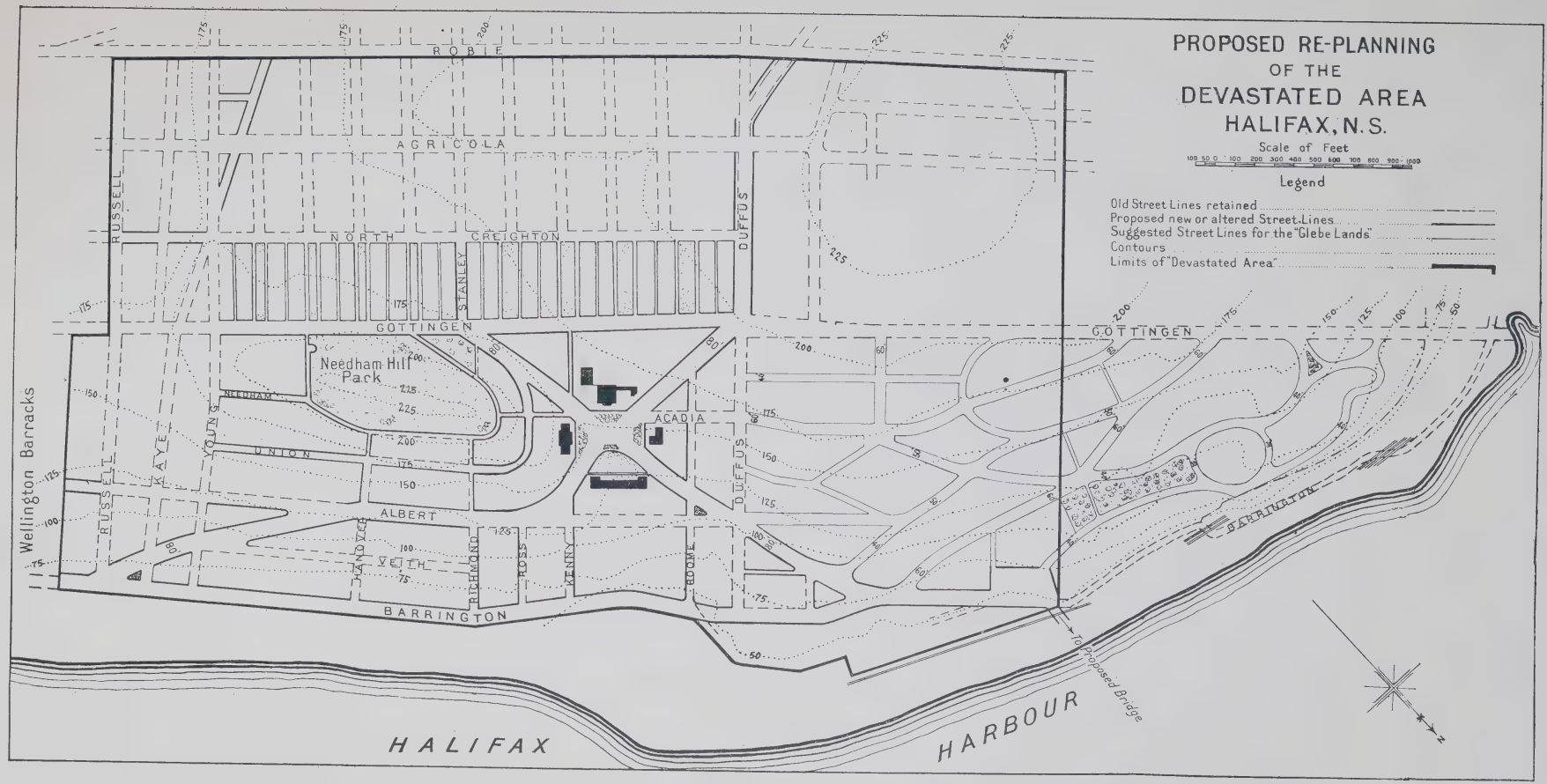
The work of planning the devastated area in Halifax and the extensive areas of unbuilt-upon land within and surrounding the city has been proceeding for the past six months. In regard to the latter, certain preparatory work was done before the disaster, but the urgency of proceeding with the work of reconstruction has had the effect of stimulating activity. Good progress has been made in fixing of the boundaries of the areas, surveying lines, and fixing grades for main arterial thoroughfares, determining building lines, selecting portions suitable for residential and industrial development, and carrying out the preliminary procedure under the Nova Scotia Act. It is too early to say much of a definite character with regard to the details of the scheme, but some of the tentative proposals may be described.

The devastated area—that is, the area more or less completely destroyed by the explosion—comprises 325 acres. This area, shown on key map, is being dealt with by the Halifax Relief Commission, under the statutory provisions included in the Halifax Relief Act. The remaining area, as indicated on key map, is included in the scheme proposed to be prepared by the Town Planning Board of the city. The Halifax County Council is preparing four schemes, as shown on key map, and numbered 1 to 4. The areas of the six schemes are as follows:—

		Acres
Map A—	Devastated area	325
	General city area	2,960
(1)	County area, west of city	5,508
(2)	" " east of Halifax harbour	4,430
(3)	" " east of Halifax harbour	3,800
(4)	" " west of Halifax harbour	4,400
		21,423

The town of Dartmouth has not yet decided to prepare a scheme but, in order to complete the proper development of the east shore of the harbour, it will be desirable to have a plan prepared for the area of that town. The advantages to be gained by the preparation of a scheme are so great that Dartmouth will certainly eventually come into line.

Nothing will be included in these schemes that is not for some useful purpose connected with the economic development of the land or for protecting the health and well-being of the inhabitants. It happens, as is usual, that what is most useful, convenient, and healthy is also best from the standpoint of appearance and amenity, but no aesthetic object is being sought for its own sake. This is not a time, nor are the conditions in Halifax such that the occasion is opportune for spending money for purely ornamental purposes. At the same



Plan A.—The main features of this tentative scheme for the replanning of the devastated area, as shown above, is the substitution of diagonal streets for the old rectangular layout. Two main diagonal thoroughfares are provided, 80 feet wide, of which the grades will generally be from 4 to 5.5 per cent, replacing grades of 8 to 20 in the former street arrangement. While 508,370 square feet of land is included in these new diagonal streets, there is a possible saving in streets, waste land, etc., of 433,140 square feet. Fort Needham, which is one of the highest points in the city, is to be developed into a park. At the northwest corner of the devastated area is shown the proposed location of a bridge across the narrows to Dartmouth.

ace p. 106.

time, full regard is being paid to the practical advantages of scientific methods of planning and to the commercial value of those elements of beauty and proportion in design that can be obtained at reasonable cost. The two chief enemies of proper planning are the self-styled ' practical ' man, without scientific knowledge or imagination, who has been running things so badly in the past, and the other is the unbalanced enthusiast, who paints beautiful pictures without considering how they can be carried into effect.

The necessity of preparing schemes that are practical, both from a financial and from an engineering point of view, is not solely due to the need for economy. One must be practical in method to get a thing done at all, and it is waste of time to set up idealistic utopias of what we would like to do but cannot. The Halifax schemes will be prepared on lines that can be carried out and enforced, however far short they may be of the ideal one would like to attain.

The following are among the matters that will be dealt with in the provisions of each draft scheme, which will be in the form of a local Act of Parliament.

Provisions of Schemes

1. Providing for submission and approval of future plans of sub-divisions to secure conformity with general plan of main thoroughfares and principles of development laid down in the scheme.

2. Fixing (*a*) varied width of streets to suit traffic requirements and height, character, and density of buildings; and (*b*) height, character and density of buildings to suit width of streets.

3. Regulating methods of financing street and sewer construction to secure equitable apportionment of cost between owners and public body according to benefit received.

4. Providing for construction of main trunk streets on sites determined in scheme.

5. Widening of streets, modification of sub-divisions already made, adjustment of boundaries of estates, and diversion of highways.

6. Fixing of open spaces, building lines suitable for residences, business premises, etc., and proportion of lots to be built upon for different purposes.

7. Prohibition of bill-boards, limitation of number of dwelling houses to acre, and obstruction of watercourses.

8. Regulations regarding appropriation of lands, inspection, compensation and betterment, agreements, penalties, appeals, suspension of by-laws, etc.

Plans

Accompanying the schemes will be maps showing, *inter alia*, the following:

1. Areas restricted for different purposes (*i.e.*, residences, factories, stores, etc.).

2. Position of main trunk streets to form chief lines of communication. (Only main arteries will be included on the plan. The details of development of intervening areas will not be fixed by the

scheme, but merely regulated under the provisions of the scheme. This is necessary to secure elasticity and allow the scheme to be adaptable to reasonable modification to suit any future change in conditions that may arise.)

3. Widenings, modifications, and diversions of streets.
4. Areas restricted as to density of building on land units determined in scheme.
5. Open spaces settled by agreement or expropriated.
6. Building lines so far as needed to be fixed on the map.

The complicated legal difficulties involved in carrying out a scheme dealing with the above matters in such a way as to secure real public advantage without much cost to the municipality and without loss to the owners of land, will be appreciated by most people. It is because of these difficulties, a town planning scheme requires a considerable period of time for preparation. When prepared, it is much more than worth the trouble, but its value has a definite relation to the time and patience exercised in preparing it.

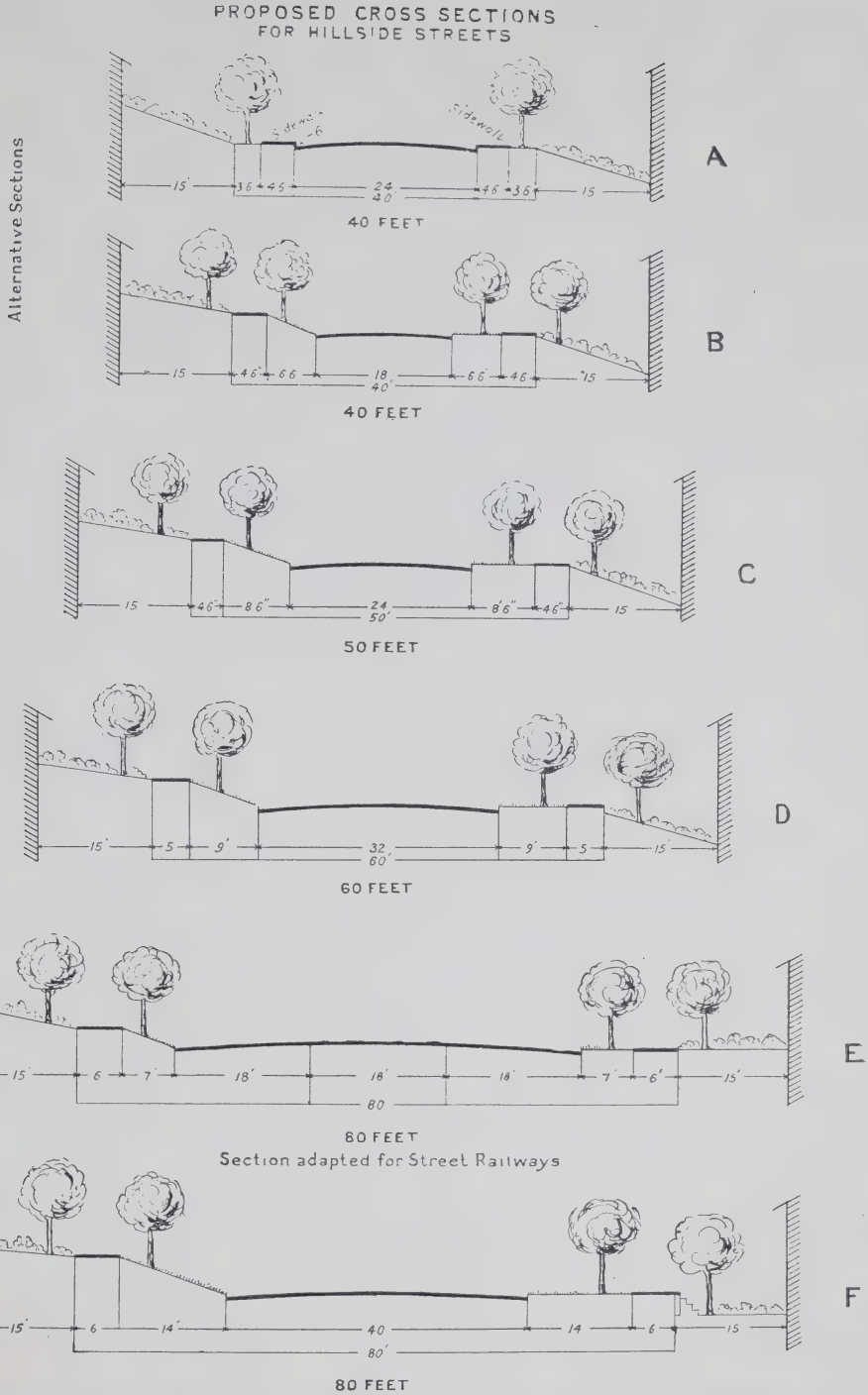
Street Plan of Devastated Area

One of the simpler and more interesting aspects of a town planning scheme is often regarded as the whole of a scheme, namely, the plan of the layout of the streets. Plan 'A' shows the tentative street scheme prepared for the devastated area. The original layout was on the usual rectangular method—wasteful and inconvenient to a degree.

The maximum grades found on the nine principal east-and-west streets were 8, 10, 11, 12, 13, 14, 15, 18 and 20 per cent, respectively.

Apart from the inaccessibility of the land owing to steep grades of the east-and-west streets, many lots were rendered useless for building by the straight north-and-south streets cutting across the steep grades at right angles. In re-planning the area regard had to be given to the existing streets, sewers, etc., and no radical change could be made in the rectangular plan without scrapping a great deal of expensive local improvements. It would have been a great advantage if the whole area had been expropriated and re-planned, but the initial cost would have been too heavy, having regard to the funds available for all needed purposes. Without interfering unduly with the existing street system, two new diagonals were laid out following lines which permitted easy grades and converging on a central square, round which it is proposed to erect some of the principal public buildings. One of these diagonals will be used for a street railway connection between the low level of Barrington street, which approximately follows a 50-feet contour line, to the high level of Gottingen street, approximately 200 feet above O.D.

It is hoped to secure the widening of Barrington street to 80 feet and also some improvement in its alignment. The widening and diversion of Barrington street, and the construction of two 80-feet diagonals converging and intersecting at the square before they reach Gottingen street, will provide the devastated area with an



NOTE.—The width of the pavement should be varied according to traffic requirements, and in many cases narrower pavements than those suggested will be adequate for many years. For instance, the width of pavement in F might be limited to 24 feet,—16 feet being temporarily placed in the grass margin until a wider pavement became necessary.

Face p. 108.

excellent system of main arteries. The grades of the diagonals will be from 2 to 5 per cent. For one short length of the least important street it is 6·5. These grades replace those of 8 to 20 per cent already alluded to. The benefit to be derived from this improvement alone will be realized when it is pointed out that these east-and-west streets form the only direct means of access between Barrington street, running parallel with the busy north end of the harbour, and the important section of the city which is served by the main artery of Gottingen street and its tributaries.

The importance of the square as a distribution centre for traffic from all directions will be noted. Right-angled collision points with the main north-and-south arteries of Gottingen and Barrington streets are avoided.

Re-planning is always expensive and wasteful. Certain land will lose its building value because of the intersection of the lots by the new diagonal streets. This is the price we have to pay for want of planning in the first instance. But, on the whole, it is hardly conceivable that a more economical scheme could have been prepared. Although 508,370 square feet of land is included in the new 80-feet diagonals, central square, etc., there is a possible saving to be obtained of 433,140 square feet in streets, waste land, etc., recommended to be converted into building land. The balance is only 75,230 square feet.

There will have to be considerable excavation and filling in connection with the construction of the new streets, but care is being taken to equalize both, and to prevent unnecessary injury to the frontage land.

On the whole, the cost of the scheme of re-development will be small compared, first, to the permanent advantages to be obtained, and, second, to the amount of the relief funds which might reasonably be apportioned for re-development.

Plans of proposed road sections for roads of different widths, and suitable both for level and hilly sites, have been prepared by the Town Planning Adviser of the Commission of Conservation. One set of these sections is shown on the accompanying diagram.

Unfortunately, the work of reconstruction is likely to be hampered by the high cost of building materials and the scarcity of labour, but these difficulties are being faced with determination to achieve the best possible results under the circumstances.

APPENDIX VII

The Town of Kipawa

The new town of Kipawa originated somewhat in the same way as the new town of Ojibway. It is being established by a large industrial corporation, which has acquired sufficient land not only to erect their works, but to house their employees. The Riordon Pulp and Paper Company decided to develop a new mill for production of pulp, and apparently came to the conclusion that the most economical situation for such a mill was near the raw materials used in their industry. They selected the site of Kipawa, because of its proximity to the timber limits and also because of the available water-power derived from Kipawa lake. The interests of Mr. John Lumsden, owner of Lumdsen's mills, and of other owners were purchased, and a compact area of about 10 square miles was brought under control for the purpose of erecting the mill and town. The consent and approval of the Quebec Government had to be obtained, and those who acted for the Government showed every desire to co-operate in helping the Riordon Company to build up a model community.

As will be seen from the accompanying plan, the site overlooks lake Timiskaming, which is part of the Ottawa river. The waters of Kipawa lake drain into lake Timiskaming by Gordon creek, which is seen between the town and the railway. The site of the mill is to the south of the town, on the opposite side of Gordon creek.

The first step taken by the Riordon Company in connection with the selection of the site for the town was to invite Mr. Thomas Adams, Town Planning Adviser of the Commission of Conservation, to advise as to the best situation. When the inspection of the area was made there were certain governing factors which made the choice very limited. The mill site had been selected, and took up nearly all the level land that was available. On one side there was lake Timiskaming, and there were other physical features, such as the Gordon creek and two tracks of the Canadian Pacific railway. At a point to the east of the area shown on the plan there was an existing mill and village known as Lumsden's Mills, and on this side also the whole of the level land was taken up by lumber yards.

The only land available for the town was hilly land to the north and south of the mill site overlooking the lake and river. Large parts of this land were covered with huge boulders and with timber or shrub of various sizes and densities. After careful inspection, it was finally decided to build the town to the north of the mill site, on what appeared to be, from the view that was obtained from the mill site, a steep hill, which would be very difficult and expensive to develop. It was found, however, on investigation, that there were considerable fairly level areas on the site, and that, in order to obtain easy grades and economical development of lots, all that was necessary was the preparation of a proper plan.

The Town Plan

The first step in preparing a town plan was to have a contour map of the site prepared, and Messrs. Ewing, Lovelace and Tremblay, of Montreal, were instructed to make a topographical survey. While this survey was being carried out by Mr. Lovelace, the site was visited by Mr. Adams and a preliminary sketch plan prepared. After sundry alternatives were considered, the main lines of the plan shown in the illustration were determined on and the surveyors were instructed to locate the roads on the ground. For this purpose paths had to be blazed through the forest and the plotting carried out under peculiar difficulties. Very creditable work was done, with the result that the whole of the lines of the plan were laid down on the ground through virgin forests. A large part of this work was carried out in the heart of winter.

Considerable care had to be taken to select sites for the churches and other institutions. One of the arrangements that had to be made was that of providing a site for the Catholic church in exchange for one which had to be abandoned where the mill is being erected, and a small cemetery had also to be changed in location. Other existing features which had an influence on the plan were the position of the station, which could not be moved very far from the present situation, and the existence of a good hotel overlooking the lake and situated in what can be made a beautiful park.

The above were existing features which could be taken into account from the beginning. A new factor, however, was introduced by reason of a plan to construct a water conduit, which is shown to intersect the whole town, and for which provision had to be made in preparing a plan. As an indication of the difficulties which have to be overcome, even when a plan is being prepared, the location of this penstock was not determined until after the original plan was prepared, and readjustment had then to be made to fit in with it.

Having regard to the very steep contours of the land, this raised all sorts of difficulties. The only approaches between the small area of the town on the south of the conduit and the larger area on the north was to be obtained by bridges over the conduit which was above ground and eight feet in diameter. The grades of the streets, therefore, had to be determined, not only with due regard to the contours of the land, but also in relation to the artificial obstruction created by the conduit. It presented the kind of difficulties which are to be found when a canal and railway on an embankment are close together and parallel to each other.

The plan as finally prepared is illustrated, and shows that the main approach from the station is obtained by two curved roads leading to the central square in different directions. A direct approach is impossible, because of the character of the ground, except by means of a wide pathway which will be provided with stairs in the steepest portions.

The site of the central square is the only level area of any size suitable for the purpose after leaving the low level occupied by the village green. It will be seen that the contours rise from 650 to

1,000 feet, which is the datum level shown above the projected road indicated by dotted lines. From the central square there is a main avenue running parallel with the lake and following an easy grade.

The houses on the west of Ridge road stand at the top of a high cliff and overlook the lake. Care has been taken to give the houses a good aspect and ample air space and open surroundings to each house. The suggestion on the plan shows mostly semi-detached houses, but there are a few individual houses for the staff, and some groups of three to six for the smallest types of houses.

The plan will be adhered to so far as the location of streets is concerned, but the architects will be permitted to use their discretion with regard to the grouping, sizes, and location of the houses. In general, however, they will adhere to the building line indicated and to the position of the public buildings. Any variation will only be carried out in consultation with the Town Planner.

Notwithstanding the steepness of the ground, the grades of most of the streets are less than five per cent. Had the land been laid out in the usual rectangular form to secure conformity with the provincial survey, the grades in some cases would have amounted to 18 per cent. The accompanying profile illustrates the comparison between the grade of the main avenue in the plan of the townsite and the customary rectangular plan which is shown below on a smaller scale.

The plan having been prepared and consideration given to the levels for purposes of drainage and to the probable source and means of water supply, the next step taken was to consult Messrs. R. S. and W. S. Lea, Montreal, with regard to the preparation of a detailed plan of water supply and sewers and sewage disposal. It was found that no readjustment of the plan was necessary to enable an economical system to be designed. A portion of the site was selected as the cheapest and best to develop in the first instance. This comprises the area lying between Kipawa road and Gordon creek in the form of an oblong, in which the Hostel and the Institute are situated, together with the crescent on the north of Kipawa road.

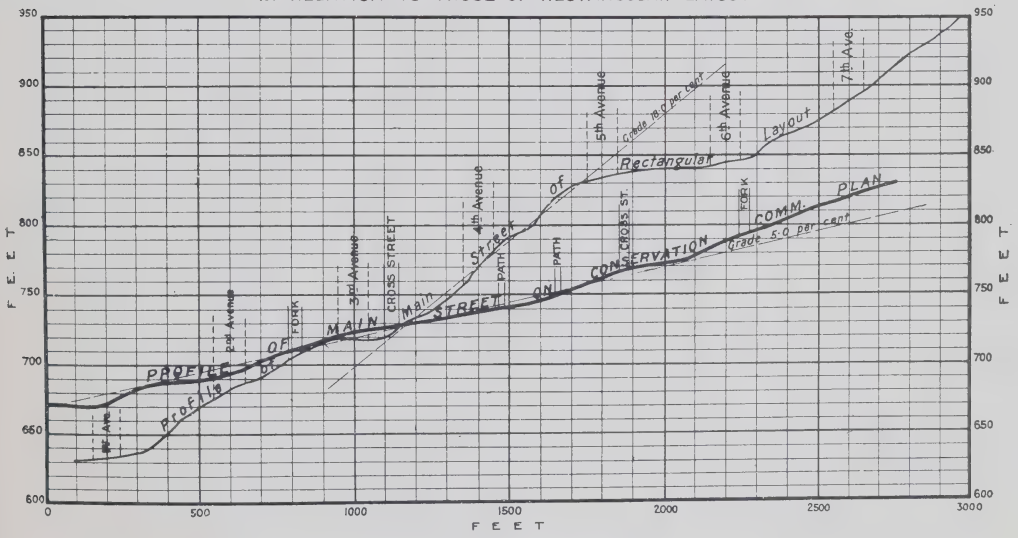
Two plans of sections of the town have been prepared, one showing the complete development which is to be carried out in the first year, and another the development to be carried out in the second stage after the first section is completed.

The designing of the houses has been entrusted to Messrs. Ross and Macdonald, of Montreal, and the first houses have been erected. It is expected that there will be a large number of houses erected during the coming year and that the mill will be completed and in operation.

A town manager and engineer has been appointed and a substantial beginning made in the development of what will become one of the most interesting of our Canadian towns.



COMPARATIVE PROFILES · SHOWING · GRADIENTS · OF · MAIN · STREET
OF · CONSERVATION · COMMISSION · PLAN ·
· IN · RELATION · TO · THOSE · OF · RECTANGULAR · LAYOUT ·



TOWNSITE OF KIPAWA, QUEBEC

Face p. 112.

APPENDIX VIII

Town Planning in Relation to Land Taxation

Proposed Alberta Schemes

The town planning schemes proposed to be prepared by the cities of Edmonton, Calgary, Lethbridge, and Medicine Hat are of particular interest because the main purpose which these cities have in view is to solve some of the financial difficulties created by past speculation in real estate. Town planning in the west is being used to help the cities to save money, whereas to many people the very name of town planning is synonymous with increased municipal expenditure.

Calgary, Edmonton, Lethbridge, and Medicine Hat contemplate the preparation of comprehensive town planning schemes for the whole of their areas. The immediate cause of their decision to do so was that they were threatened with the reduction of their areas, under the pressure of owners of suburban lands, who have applied to the Public Utility Commissioners to have their lands taken out of the cities in order that relief may be obtained from the high assessment and taxation. Faced with this problem, the cities have come to realize that they must plan their areas with proper regard to their use for different purposes, including agricultural purposes in the suburbs, and that they should fix their assessments in accordance with these uses.

They propose to plan and separate all agricultural lands within the city from business and residential lands. The underlying principle of the division between agricultural lands and building lands will be that the former will not be required for building within a reasonable time. Land in the agricultural division will be assessed at only agricultural value. It is proposed to cancel all subdivisions on the agricultural area, and to permit no new subdivisions unless in accordance with the scheme. When land in the agricultural area is permitted by the Council to be transferred to the building area, and thereby to get the full benefit of the public utilities, it will be subject to an increment tax suggested at 50 per cent of the difference between the assessed agricultural value and the assessed building value. No utilities, such as sewers, water mains, pavements, etc., will be extended to the agricultural area except at the cost of the owners, and only then by agreement with the city. So long as the land remains in the agricultural area no utilities will be extended, except for agricultural purposes. Maps and schemes are now being prepared to carry out these objects.

One of the things that has never been clear to the western city is that agricultural land may be within the city boundaries.

It has been assumed that any land included in the city becomes, *ipso facto*, building land, no matter what the ratio is between the

growth of the population and the area of the city. Since the passing of the boom, western cities have begun to realize, happily, that it is unwise to tax land at a higher rate than it can bear, having regard to its revenue-producing capacity and subject to the community getting the increment of value due to its own expenditures. A great deal of land at present does not produce revenue, because, while it is really useful for agriculture, it is being held for building purposes, for which it may not be required for perhaps 40 or 50 years.

In the scheme suggested at Calgary, about one-half of the city area will be included as building land, and the remainder, amounting to no less than 20 sections, or about 12,800 acres, will be defined as an agricultural zone.

By stopping subdivision in these agricultural zones until the inner building zone is built up to at least a density of two-thirds of its area, the owners of suburban land will realize that their best way to derive profit from the land will be in farming it and improving its fertility. At present, vast tracts of such land are lying idle, because the owners are living in the illusion that their farms will be required for building purposes.

The present population of Calgary is about 60,000. Its total area is 25,920 acres. This area accommodates a population of 777,600, on the wholesome basis of 30 people to the acre. It is felt, however, that it is not unreasonable to limit the present expectations as to future growth to less than one-half of that number, say about 350,000, so far as the planning of the city is concerned, and that, even then, ample concession is being made to the hopefulness of those who own real estate.

There is room for this population of 350,000 within a radius of one-half mile of the street railways of Calgary. Within this radius there are sewers and water mains provided in, or ready for extension to, most of the streets, but it is unreasonable to ask the present generation to bear the burden of local improvements for a population of even this number. At present, however, they are responsible for local improvements for a subdivided area which would provide for a population 13 times the present size. How can high taxes be avoided under such conditions?

If one were starting *de novo*, it would be enough to have local improvements actually constructed only slightly in advance of existing needs.

Having arrived at the decision that one-half of the area of a city is enough to provide for reasonable growth for many years, the remainder of the land should be treated as agricultural land for the time being, or taken out of the city. Otherwise it will be taxed at a rate which the average owner cannot pay, and the city will get no benefit from this taxation, because it is responsible for extending local improvements which cost more than the taxes are worth, even when the latter can be collected. Growing arrears of taxes and continued improvement extensions beyond needs have bad effects on the finances of any city.

The treatment of the agricultural zone is the most novel proposal to be included in the scheme, and I have referred to that at some

length because it is, or ought to be, of special interest to the citizens of Ontario, who have similar problems to deal with in their own suburbs in Ontario cities. A large portion of land in the suburbs of most cities is sterile and idle, because it is being held for building purposes long before it is wanted for same. The only hope of getting this land into cultivation, and simultaneously preventing extravagant and unhealthy expansion, is to bring it under a proper town planning scheme. The following are among the suggested provisions for the schemes proposed for the western cities:

> No streets, sewers, or water-mains shall be constructed in such area, except at the expense of the owners of the land, and subject to the approval of all plans, sections, and particulars by the city.
>
> No land shall be subdivided or used for building purposes, or for any purpose not connected with the use of the land for agriculture or horticulture, in such area unless with the consent in writing of the city authority, where the authority is satisfied that the land is needed for building, and not less than two-thirds of the subdivisions in the parts of the area adjacent to the proposed new subdivisions are already used for building purposes.
>
> Land already subdivided in the said area shall be reverted to acreage.
>
> When the consent of the city authority is obtained to the future subdivision of any land within the agricultural zone, the said land shall forthwith come under the provisions of this scheme as if it were building land, and it shall be assessed as such. The city shall collect an increment tax on the occasion of sale or of conversion of the land from agricultural to building land, suggested as 50 per cent of the increased value realized or assessed.

To divide the cities into zones in which regard is paid to the economic use of the land, health, and convenience of the people, instead of to the speculative interests of owners, is, in practice, one of the most effective means of avoiding injurious speculation. The use of the land becomes the determining factor in its value, and whatever increment may accrue to it from change of that use, say from agriculture to building, should become the subject of a heavy tax. The fact that certain lands are ear-marked under a scheme for agriculture increases the value of the central areas for building purposes, and this justifies the placing of higher taxes on the land in central areas.

The whole problem of housing is mixed up with this question of land, and the development of land is so dependent upon town planning of the right kind that housing and town planning schemes must proceed side by side.

APPENDIX IX

Civic Improvement League of Canada

Western Conference at Victoria, B.C., July 9-11, 1918

A joint conference of the Civic Improvement League of Canada and the Union of Canadian Municipalities was held at Victoria, B.C., on Tuesday, Wednesday and Thursday, July 9, 10 and 11.

Addresses of welcome were given by Premier Oliver of British Columbia and Mayor A. E. Todd of Victoria. Ald. W. R. Owen of Vancouver presided.

Among the subjects discussed were: "National and Municipal Housing," introduced by Mr. Thomas Adams, Town Planning Adviser to Commission of Conservation; "Municipal Responsibility in Regard to the Economic Development of the Land," introduced by Mr. J. N. Bayne, Deputy Minister of Municipal Affairs, Saskatchewan; "The Returned Soldier Problem," and "The Necessity for a Vocational Education."

National and Municipal Housing

In speaking on "National and Municipal Housing," Mr. Adams said that the working-class housing conditions in Canada before the war were, as they were in all civilized countries, unsatisfactory. At its root the housing question was a land question. An investigation that was recently made in Vancouver showed that, to purchase a 50-foot lot, put in the pavement, sidewalks and build the sewer, cost $2,083, before the house was built. This meant that a man had to spend as much on the land and local improvements as he could afford to spend on the whole home. A man earning $25 per week could thus only afford to pay interest and sinking fund on the improved site; but the object of developing the site was to make it suitable for erecting a home, and if he spent so much on the site that he could not carry out his object the money was wasted. The cost of land and development should not exceed the proportion of one-sixth to one-fourth of the cost of the building. They could not get homes for workmen unless they were able, in the future, to set off against the increased cost of labour and material, reduced costs of land.

In regard to the question of building houses by government aid, under the conditions which existed as a result of the war, they had to take into account that private enterprise was practically dead for the time being, so far as building houses was concerned. They could not attract private capital for housing when the cost of material, the cost of labour, and the high cost of development were as great as at present. They were face to face with the same conditions as in Great Britain and the United States. Some government action would be necessary.

"At the present moment," Mr. Adams said, "the most urgent question is that of war-housing. Britain and the United States are dealing with this as an important war measure, and this phase of the housing shortage in these countries is being met by means of housing schemes promoted and financed by the national governments. In Canada we are also in urgent need of houses to help in winning the war; we need them to enable us to increase the output of our war industries.

"Private enterprise may be dismissed as a factor under present conditions. Apparently, therefore, we must have recourse to government aid, be it Federal or Provincial, and government aid involves government supervision. The Federal Government is the authority under the War Measures Act, and housing war-workers is a war measure. Therefore, this is primarily a matter for the Federal Government; although, for practical purposes, it should delegate as much responsibility as possible to provincial and municipal governments. Large employers of labour, who need housing accommodation, should be asked to co-operate in any government scheme, in their respective localities.

"If Government housing were resorted to in this country it should be carried out by a joint partnership between Federal, provincial and municipal authorities. The Federal Government should provide the funds, and should set up a central expert advisory and supervisory board. It should not build houses directly under its own control, except for employees in government factories, arsenals, naval establishments or railways. In all other cases, housing operations in connection with war industries and returned soldiers should be carried out by the municipalities, with the aid of funds and expert advice provided by the Federal Government through the agency of Provincial Governments. Departments of Provincial Governments should take the responsibility for proper housing schemes, under some regulation of the Federal Government, and subject to its supreme control in matters of finance. For the present, no housing scheme should be carried out with the aid of public funds unless for some purpose directly connected with war production or arising from necessities created by war conditions, but all such schemes should consist of permanent buildings, so as to make them contribute to the solution of the general problem of reconstruction after the war."

Municipal Responsibility in regard to Economic Development of the Land

In speaking on this subject, Mr. J. N. Bayne, Deputy Minister of Municipal Affairs for Saskatchewan, said the time had come to recognize that municipal authorities, whether urban or rural, have a great responsibility in directing the economic use of the land.

Among the different ways in which that responsibility might be discharged, Mr. Bayne referred to the construction of streets, roads, and highways, which would enable the producer to bring his products to the consumer with the least possible wear and tear on his equipment.

The next was a proper system of graded taxation, that will encourage cultivation of the soil in a manner profitable to producer and consumer. Mr. Bayne said: "Possibly a bonus for cultivation may be given, or, as is sometimes done, a penalty for failure to cultivate land by way of additional taxation may be imposed. The results are almost the same, but the bonus instead of the penalty is a little more easily managed, and perhaps gives more encouragement to the owners of lands to make the most of them while in their care and keeping. In Saskatchewan there existed, from 1914 to 1917, inclusive, a special speculator's rate, known as the surtax, levied on wild or uncultivated farm lands. This was collected by the rural municipalities of the province, and by them spent for general improvements within their boundaries. No regular farmer or settler had any surtax whatever to pay in respect of his farm. Ten dollars per quarter-section, or six and one-quarter cents per acre, was the amount of the supertax. It can be readily understood that it was attacked constantly by those who wished to have their speculative holdings advance in price through the efforts and settlement of men who actually farmed or produced wealth from the soil. During this four-year period, an average of $680,658 surtax was imposed in the rural municipalities of the province, which greatly assisted them in carrying on their duties. In the autumn of 1917, legislation was passed whereby the 'wild lands tax' took the place of the 'surtax.' It is now levied on a basis of one per cent of the assessed value of the uncultivated land. The municipalities enjoyed this special rate for four years, but, after having this assistance in the earlier years of their existence, it was withdrawn, and is now payable to the general revenues of the province. It will be readily seen that the wild lands tax will be in excess of the surtax. As already explained, the latter was on a flat rate per acre, and amounted to ten dollars per quarter-section. The wild lands tax on a quarter-section valued at ten dollars per acre will now be sixteen dollars, which fact should further encourage the cultivation of the land. The other Prairie Provinces have now similar legislation in this regard. In the 300 rural municipalities of Saskatchewan, the wild lands tax is collected by them and transferred to the Provincial Government. In the unorganized territory on the frontiers of the province, this tax is assessed and collected direct by the Department of Municipal Affairs. Surely the surtax, or the wild lands tax, is one way of disposing of municipal responsibility in regard to the development of the land."

Mr. Bayne suggested that development of land might also be encouraged by a more reasonable lay-out or subdivision of the townships. There are three things necessary for economic production from the land—land, labour, and capital. Land was no use unless it were cultivated, and labour could do little without the implements. which could only be supplied by capital. Capital used only in the purchase of land and not in its development makes no contribution, so far as production is concerned, but fertile land cultivated by intelligent labour, assisted by modern and up-to-date machinery, would do everything to meet the needs of the world's starving millions.

Western municipalities had realized the importance of encouraging and assisting those who were striving to solve the problem of greater production, by supplying seed grain to those who were unable to secure it for themselves.

"Another means of encouraging development of the land by municipalities in general," he said, "is practical and systematic town planning and rural development. There are yet many in Canada who do not give this important subject the attention which it demands. Public reason and sentiment, however, are getting behind it more and more every day. I do not need to explain to the delegates that this is accounted for largely through the presence and work in Canada of Mr. Thomas Adams, Town Planning Expert, whose capacity and success are well known to Canada's nine provinces. Had all our provinces enacted rural and urban planning legislation, what subdivision nonsense and complications might have been avoided! In the east and west we have large cities and towns, also some villages, surrounded by large areas which should be under cultivation but are not because they have been subdivided into blocks and lots, and these small parcels are likely owned by unfortunate purchasers who do not live near them. Saskatchewan has gone a long way towards overcoming this condition.

"In 1914 it passed an 'Act respecting Subdivisions.' One section of it reads as follows:

> 3. The legal or equitable owner of any portion of a subdivided area within the limits of a city, town, village, or rural municipality, whether the plan of subdivision is registered or unregistered, may apply to the Local Government Board for permission to enter upon and occupy any vacant land in such area for the purpose of cultivating the same in common with his own property, and the board, after notice to the owner of such vacant land, in such form as it may by regulation prescribe, may grant to the applicant the permission sought upon such terms and conditions as may seem just.

"Besides this clause the Provincial Legislature has made as easy as possible, through municipal institutions and otherwise, the restoration to acreage of subdivisions. This has proved a real agency in the economic development of land. Under proper town planning supervision, land within a municipality suited to farming only, would be devoted to that purpose, and only a proper area for the convenient housing of the populace in the present and reasonably near future would be allowed.

"Land should be developed by sane and logical methods, and, even at the risk of being challenged at this time when 'greater production' is in the air, let it be said that the process should not always be for production purposes. Land should be developed by municipalities for making beautiful and homelike the dwellings within their boundaries. At the thirteenth annual convention of the Union of Saskatchewan Municipalities, held last month in Regina, the Lieutenant Governor brought home to the delegates the number of people who were constantly leaving the prairies, where a competency had been secured, to seek and make homes in this, the Pacific,

Province. Surely one vital duty of a municipality is to make use of the lands under its control or supervision, that its homes may be real homes, and that contentment and permanency may be characteristic of them. The beautiful municipality should be an ideal as well as a useful or productive municipality; in fact they go hand in hand, and one is never accomplished without the other. The 'city beautiful' is naturally the 'city healthful,' and the latter is always the 'city progressive.'"

In the discussion that followed, Mr. Adams said: "At present there are in force in Canada seven Town Planning Acts. The most recent is in Prince Edward Island, with the appointment of a commission to deal with it. We are now preparing a plan for the town of Port Borden. The Saskatchewan Act was passed, and it came into force this month. It is perhaps the most advanced that we have. The only provinces that have no legislation are Quebec and British Columbia."

The following resolutions were carried unanimously:—

Resolution No. 1—Housing—Whereas, a serious situation exists in industrial centres in Canada because of the lack of adequate housing accommodation at reasonable rates, creating conditions that menace the industrial, social and political welfare of the whole country;

And whereas, it has been demonstrated that private initiative, operating through the law of supply and demand, has not met adequately the housing requirements of progressive communities;

And whereas, in all the principal countries of Europe, in Australia and in Ontario, governmental responsibilities for the improvement of housing have been recognized by legislation, providing for the advance of the public credit in various forms, and in varying degrees in furtherance of improved housing undertakings, and in the United States the National Government has recently appropriated $100,000,000 to provide for housing for shipyard workers and those engaged on war contracts;

And whereas, Great Britain, recognizing that adequate housing is essential to industrial efficiency, has spent, since the war began, large sums in providing the most approved housing for war-workers, and, as a part of its reconstruction programme after the war, has planned for the erection of at least half a million houses;

And whereas, we believe that adequate housing facilities are essential to industrial progress and national well-being;

Therefore, this conference submits that it is urgently incumbent upon our Municipal, Provincial and Dominion Governments to seriously consider the whole question of housing reform, in order that plans may be laid for the provision of adequate housing facilities, looking towards the increase of home ownership, and that measures be taken for the early realization of these plans. Furthermore, we beg respectfully to submit to the Dominion Government that immediate progress can be made by enlarging and emphasizing the Housing and Town Planning work of the Dominion, and to the Provincial Governments that arrangements should be made to consider ways and means with regard to the whole question of housing betterment.

Resolution No. 2—Town Planning, etc.—That this conference approves the general principle of each province having adequate powers to prepare comprehensive town planning schemes to regulate housing developments and to secure improved sanitary conditions, convenience for traffic and the economic use of land for all purposes, and submits to the Government of British Columbia, the desirability of passing the necessary legislation for the purposes, similar to the Acts in force in the other provinces, as adapted to local conditions.

Resolution No. 3—Formation of Local Leagues—That this meeting of members of the Civic Improvement League of Canada urge the people of the cities, towns and rural districts in British Columbia to organize local Civic Improvement Leagues throughout the province, for the purpose of stimulating greater public interest in municipal affairs and to promote future conferences to discuss how best to improve civic and social conditions.

Resolution No. 4—Investigation of Causes of High Mortality—That, in view of the urgent need for the conservation of all the resources of Canada, and particularly of the lives of its citizens:

That, inasmuch as this must be done, not only through their action as individual citizens, but also through their several governments, federal, provincial, and municipal, it is hereby

Resolved, that this conference urge that such federal and provincial assistance be given to municipalities in the investigation of these local conditions which may be the cause of high mortality in any community, in order to determine what measures are necessary for the removal of said conditions and the best means available to this end.

Resolution No. 5—Approval of Work of Commission of Conservation—Whereas, the Commission of Conservation of Canada has been largely responsible for the development of favourable public opinion on the perpetuation of forests, their safeguarding from fire and pests; of valuable information accumulated bearing on our enormous fire waste; the improvement of housing conditions in congested localites; the establishment of proper methods of general fire prevention, the economic development of municipalities, and betterment of living and social conditions; the utility of systems of good roads; the conservation of the fisheries and the prevention of the alienation of water-powers, land, minerals, and other natural resources;

And whereas, the public opinion so created has become crystallized in the form of municipal regulations, Dominion and Provincial legislation, having in view the eradication of existing evils;

And whereas, there is still great necessity for the stimulation of public interest in best methods of conservation of resources;

Be it therefore resolved, that this conference record its continued interest in the work carried on by the Commission of Conservation, and its approval of the efforts of the Commission to promote the development of the national resources on a basis which ensures continuous supplies and eliminates extravagance and waste.

Problem of Returned Soldiers

Some consideration was given to the problem of the returned soldier. A resolution was proposed by Mayor Perry, of Prince George, to ask the Government to take large blocks of agricultural land and engage large numbers of returned soldiers under expert military management and under army conditions, the land subsequently to be divided among the soldiers.

Mr. Adams suggested that it was premature to conclude that a large number of soldiers were really anxious to go on the land. If any such scheme became practical, he suggested that it would be necessary, first, that the land should be subdivided in a way in which it could be properly used. The great difficulty in Canada was to get access to good land near to markets.

Mr. Lighthall said that he had had a great deal to do with returned soldiers, and he found that they were organizing throughout the Dominion to settle their own problems, and he believed the best service would be to back them up and call on the Government to back them up in their own plans and their own ideas.

No definite action was taken.

APPENDIX X

Orders in Council on Housing

1—GRANTING OF LOAN OF $25,000,000

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 3rd December, 1918. P.C. 2997.

The Committee of the Privy Council have had before them a Report, dated December 2, 1918, from the Minister of Finance, submitting that at the Conference recently held at Ottawa, between the Premiers and other members of the Governments of the several provinces and representatives of the Dominion Government, one of the important subjects of discussion was that of creating better housing conditions for the industrial population of our larger centres.

The Minister observes that owing to the practical cessation of building operations during the war there is at present a great scarcity of housing accommodation in most of our cities, and this condition will become intensified with the return of our soldiers from overseas and their re-establishment with their families in civil life and occupation.

The Minister states that at the conference it developed that some of the Provincial Governments were considering the adoption of a policy of making loans to municipalities or otherwise, extending over a long period of years and repayable upon the amortization plan, for the purpose of promoting the erection of dwelling houses of a modern character to relieve congestion of population in cities and towns in their respective provinces, and the question was raised as to whether the Dominion Government would aid the several Provincial Governments in carrying out such a policy by making loans to them to place them, to the extent that might be necessary, in funds for the purpose.

In view of the national importance of the matter, which touches vitally the health, morals, and general well-being of the entire community and its relation to the welfare of returned soldiers and their families, together with the fact that the carrying out of such a policy on a substantial scale by Provincial Governments would afford considerable employment during the period of reconstruction and readjustment of industry following the war, the Minister recommends as follows:

1. That the Minister of Finance be authorized, under the provisions of the War Measures Act, upon request from the Government of any province of Canada, to make loans to such Government for the purpose mentioned.

2. That the aggregate amount to be loaned to all provinces shall not exceed twenty-five million dollars, and the amount of loan to any one province shall not exceed the proportion of the said twenty-five

million dollars which the population of the said province bears to the total population of Canada.

3. That the loans made hereunder may be for a period not exceeding twenty years, with the right to any province to pay off the whole or any part of the principal of the loan at any time during the said term.

4. That interest at the rate of five per cent per annum, payable half-yearly, shall be charged upon advances from the dates thereof, respectively.

5. The Minister of Finance may accept bonds, debentures, or such other form of security as he may approve evidencing the indebtedness of any Provincial Government for loans made hereunder.

6. Advances shall be made from the War Appropriation.

7. Advances may be made as soon as a general scheme of housing shall have been agreed upon between the Government of Canada and the Government of the province applying for a loan hereunder.

The Committee concur in the foregoing recommendations and submit the same for approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council

II—CONSTITUTION OF CABINET COMMITTEE ON HOUSING

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 12th December, 1918.
P.C. 3067.

The Committee of the Privy Council have had before them a report, dated December 10, 1918, from the Acting Prime Minister, stating that, by order of the Governor General in Council, dated December 3, 1918, the Minister of Finance was authorized, upon request of the Government of any province of Canada, to make loans to such Government for the purpose of promoting the erection of dwelling houses of modern character to relieve the congestion of population in the towns of their respective provinces, the aggregate of such advances to all the provinces not to exceed $25,000,000.

By the said Order in Council it is further provided that advances may be made as soon as a general scheme of housing shall have been agreed upon between the Government of Canada and the Government of the province applying for a loan thereunder.

The Minister observes that, in view of the national importance of adequate and suitable housing accommodation, which affects vitally the health, morals, and general well-being of the entire community, it is desirable that the financial assistance thus provided should be utilized at the earliest possible date in the provision of the housing accommodation contemplated by the said Order in Council.

The Minister further observes that it is therefore desirable that a Committee of the Cabinet should be appointed, to be known as the

Housing Committee, which shall be authorized to take up without delay with the several provinces of Canada the question of their need for additional housing accommodation and the housing programme they have in view, in order to secure an early agreement with the said provinces under which the said moneys may be utilized for housing purposes.

The Minister therefore recommends:

1. That there be constituted a Committee of the Privy Council, known as the Housing Committee, consisting of the following members:

Hon. Mr. Rowell, President of the Privy Council;

Hon. Mr. Robertson, Minister of Labour;

Hon. Mr. Maclean, Vice-Chairman of the Reconstruction and Development Committee of Canada; and

Hon. Mr. Crerar, Minister of Agriculture.

The Honourable Mr. Rowell is to be Chairman of the Committee.

2. That this Committee formulate the general principles which should be followed in any housing schemes in order to secure the results aimed at by the said Order in Council.

3. That the Committee communicate with the Governments of the several provinces of Canada in reference to the matters above mentioned, with a view to agreeing with the Governments of the said provinces, respectively, upon any such general schemes of housing, so that the moneys provided by the said Order in Council of December 3, 1918, may be applied for the purposes contemplated by the said Order.

4. That the Committee be authorized and empowered to do and perform all such further acts as may be necessary in order to carry out and give full effect to the said Order in Council of December 3, 1918.

The Minister further recommends that the said Committee be authorized to secure the assistance and co-operation of Mr. Thomas Adams, the Town Planning Expert of the Commission of Conservation, and of any other person or persons specially qualified to advise or assist the said Committee in carrying on its work.

The Minister further recommends that all expenditures incurred by the Committee be charged to the War Appropriation Vote.

The Committee concur in the foregoing recommendations, and submit the same for approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council

III—GENERAL PRINCIPLES TO BE FOLLOWED IN HOUSING SCHEMES

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 20th February, 1919. P.C. 374.

The Committee of the Privy Council have had before them the report and statement, dated February 18, 1919, of the Housing Com-

mittee of the Privy Council, appointed under the Order in Council (P.C. 3067) of the 12th December, 1918, to formulate the general principles which should be followed in any housing scheme in order to secure the results aimed at by the said Order in Council.

The Housing Committee observe that they have submitted the general principles to the Governments of all the provinces, and requested suggestions from the said Governments with reference thereto, and after duly considering all such suggestions, the Committee submit the following statement and report, and recommend the approval thereof by Your Excellency in Council, and further recommend that, upon approval, copies of said memorandum be furnished the Governments of the said provinces of Canada.

The Committee of the Privy Council concur in the report and statement of the Housing Committee, and submit the same for Your Excellency's approval accordingly.

RODOLPHE BOUDREAU,
Clerk of the Privy Council

OTTAWA, February 18, 1919

To His Excellency the Governor General in Council:

The Housing Committee of the Privy Council, appointed under Order in Council P.C. 3067, of December 12, 1918, to formulate the general principles which should be followed in any housing schemes in order to secure the results aimed at by the said Order in Council, and to communicate with the Governments of the several provinces of Canada, with a view to agreeing with the Governments of the said provinces, respectively, upon general schemes of housing, so that the moneys provided by the Order in Council of December 3, 1918, P.C. 2997, may be applied for the purposes contemplated by the said Order, respectfully reports as follows:

Your Committee has formulated the general principles which should be followed in any housing schemes in order to secure the results aimed at by the said Order in Council, and has submitted these general principles to the Governments of all the provinces, and requested suggestions from the said Governments with reference thereto, and, after duly considering all such suggestions, your Committee begs to submit the following statement and report, and recommends that, upon approval thereof by the Privy Council, copies of the said memorandum be furnished to the Governments of each of the provinces of Canada.

INTRODUCTION

(1) *General Object in View*—The object of the Government in making provision for a loan of $25,000,000 at 5 per cent to the Provincial Governments for housing purposes is: (*a*) To promote the erection of dwelling houses of modern character, to relieve congestion of population in cities and towns; (*b*) to put within the reach of all workingmen, particularly returned soldiers, the opportunity of acquiring their own homes at actual cost of the building and land acquired

at a fair value, thus eliminating the profits of the speculator; (*c*) to contribute to the general health and well-being of the community by encouraging suitable town planning and housing schemes.

(2) *Promotion of Housing Schemes Matter for Provincial and Municipal Jurisdiction*—The provision of houses, so far as it may be regarded as a public duty, is a matter which comes more properly within the jurisdiction of the provinces and municipalities, and, in ordinary circumstances, the question of what regulations should be imposed, and what policy should be adopted, in regard to the administration of housing schemes, are matters for these Governments. As the Federal Government will lend the money on the general security of each province, it is not necessary to impose financial regulations as to the means which should be employed to safeguard the loans.

Conditions on which Loans will be Granted by the Federal Government

Having regard, however, to the responsibility incurred by the Federal Government in providing the money, and to the object for which the money is proposed to be lent, loans will be made to the Provincial Governments on the following four conditions:

(1) *Approval of General Provisions*—Each province shall prepare and submit to the Federal Government for approval, a general housing scheme, setting out the standards and conditions to be complied with in connection with local housing schemes. The general scheme of each province should include a schedule of minimum standards in regard to grouping of houses, provision of open spaces, sizes and heights of houses, sizes and heights of rooms, provisions of light and ventilation, heating, lighting, character of materials, etc., which it is proposed should be enforced as the minimum requirements for health, comfort, and convenience.

(2) *Maximum Cost of Dwellings, etc.*—The object of the Federal Government being to facilitate the erection of dwellings, at a moderate cost, suitable for workingmen, particularly returned soldiers, it is necessary to place a maximum on the amount which may be loaned per dwelling, and the following maximum has been fixed, having regard to the conditions existing in the different provinces:

(*a*) Detached or semi-detached dwellings, with walls constructed wholly or partly of frame, stucco on frame, brick veneer, inclusive of the capital value of the site and necessary local improvements:

With 4 or 5 rooms, exclusive of bathroom and summer kitchen, $3,000.

With 6 or 7 rooms, exclusive of bathroom and summer kitchen, $3,500.

(*b*) Detached, semi-detached, groups of three or more or duplex (cottage flat) dwellings, with walls of brick, hollow-tile, stone or concrete, and roofing of fire-proof materials, inclusive of the capital value of the site and necessary local improvements:

With 4 or 5 rooms, exclusive of bathroom and summer kitchen, $4,000.

With 6 or 7 rooms, exclusive of bathroom and summer kitchen, $4,500.

(3) *Ownership of Land*—Public money may be advanced for building houses on sites owned by:

(*a*) The Provincial Government or municipality.

(*b*) Housing societies or companies, comprising groups of citizens associated to promote good housing, supplied with proper improvements; such societies or companies to have not more than a statutory limitation of dividends payable on stock of 6 per cent.

(*c*) Owners of lots for the purpose of erecting houses for their own occupancy.

(4) *Terms of Years for Repayment of Loans*—The federal loan will be repayable by the province over a period of twenty years; provided that, in order to encourage the erection of more durable buildings, and to bring the financial terms within reach of a large number of workers, the period of 20 years may be extended to 30 years in respect of any portion of the loan which the Provincial Government may decide to re-lend for thirty years for such purposes as purchasing land or erecting buildings under the above class. Repayments by the provinces on account of federal loans may be made quarterly, if so desired, or otherwise as may be agreed upon.

General Principles and Standards Recommended for Consideration in Schemes

Subject to the four requirements set forth in Part II of this memorandum, the Federal Government does not impose any conditions in regard to the nature of the scheme or the type and character of the dwellings to be erected, but strongly recommends that in framing schemes, consideration be given to the following matters:

(1) *Acquisition of Sites, etc.*—The success of the housing movement depends upon the acquirement of suitable land at its fair value and at a cost which workingmen can afford to pay. It is essential, therefore, that statutory provision shall be made by the provinces for a cheap and speedy method of compulsory taking of the land required for housing purposes. To facilitate proper planning and to secure economy in connection with housing schemes, comparatively large sites should, as a rule, be chosen, so as to permit of comprehensive treatment. Such sites should be conveniently accessible to places of employment, means of transportation, water supply, sewers, and other public utilities.

(2) *Planning of Sites, etc.*—Where housing schemes are proposed, the sites as well as the buildings should be properly planned, so as to secure sanitary conditions, wholesome environment, and the utmost economy. The land should be sold under building restrictions which will ensure its use for residential purposes only, and should it thereafter be desired to utilize any of the lots so sold for

stores or other business purposes, the increased value for such business sites should be made available for public purposes in connection with such scheme.

(3) *Loans for Separate or Individual Houses*--In those cases where loans are given to workingmen owning lots, care should be taken to ensure that the site proposed to be built upon occupies a healthy and convenient situation, and that suitable provision can be made in such situation for the erection of a sanitary type of dwelling with adequate provision for open spaces.

(4) *Limit of Income of Persons to be Provided with Dwellings*—In order to ensure that the money shall be loaned to those who most need it, no person in receipt of an income exceeding $3,000 per annum should be eligible as a purchaser or tenant of a house erected with the aid of Government funds in any schemes carried out by Provincial Governments, municipalities, housing associations, or owners of lots.

(5) *Construction of Local Improvements to Precede Occupation of Dwellings*—In cities and towns, local improvements, comprising necessary sewers, pavements, sidewalks, water-mains, and lighting services, should be constructed, as far as practicable, prior to, or simultaneously with, the building of houses, and no house should be permitted to be occupied until provided with proper means of drainage and means of sewage disposal and an adequate supply of pure water.

(6) *Reservation of Sites for Playgrounds, etc.*—In all new housing schemes, provision should be made for reserving at least one-tenth of the total area of land being developed for building purposes, as open space for playgrounds, etc., and also for reserving suitable sites for such institutes, public buildings, and stores as may be required.

(7) *Loans to be used for Purchasing and Developing Land and Erecting Dwellings*—Advances should be made for: (*a*) The purchase of suitable land for housing schemes; (*b*) the construction of the necessary local improvements on and in connection with the development of such land as part of a housing scheme; (*c*) the erection of sanitary and economical dwellings.

(8) *Proportion of Cost of Land to Dwelling*—The proportion of the money lent in respect of the capital value of the bare land (*i.e.*, irrespective of all local improvements or other public services provided to adapt the site for building purposes) should not as a rule exceed one-tenth, and in no case should exceed one-eighth of the above gross cost of the dwelling. Example—In computing the value of the bare land under this clause, the cost of such improvements as have been made should be deducted. For instance—the sum of $3,000 might be lent in the following proportions:

Cost of dwelling	$2,400
Cost of land	300
Capital cost of local improvements	300
	$3,000

If the value of the bare land is estimated to exceed one-tenth ($300), in this case the extra cost should be met by the owner.

(9) *Recommendations as to Minimum Standards in regard to Sites*—

(*a*) *Streets*—All dwellings erected in cities and towns should face on streets so constructed as to provide dry and convenient means of access to such dwellings, or on approved courts opening on to such streets and in no case on lanes or alleys.

(*b*) *Sanitary provisions*—In cities and large towns, sewers and water-mains should be provided to enable connections to be made as buildings are erected; and in small towns, villages, and rural areas where no sewers exist, there should be proper sanitary provision for sewage disposal, to the satisfaction of the Board of Health or sanitary engineer of the province.

(*c*) *Water Supply*—All dwellings should have connected to them an adequate supply of pure water before occupation is permitted for purposes of habitation.

(*d*) *Drainage of Sites*—No building should be erected on a site which shall not have been drained of surface water, or which shall have been filled up with any material impregnated with fæcal matter, or with animal or vegetable matter, unless and until such matter shall have been removed, and the ground surface under such building shall be properly asphalted or covered with concrete or other dry and hard material to a thickness of six inches at least.

(10) *Recommendations as to Minimum Standards in Houses*—

(*a*) *Space Around Dwellings*—Provision should be made for securing ample garden and air space surrounding the dwellings to be erected. In cities and towns, each dwelling should occupy a lot comprising at least 1,800 square feet, and, in villages and rural areas, at least 4,500 square feet. Not less than 50 feet of clear open space in depth should be provided at the rear of dwellings, and the buildings should not occupy more than 50 per cent of the lot. Spaces between the gable or end walls of adjacent buildings should be provided as follows:

Between all buildings (single or in pairs), the walls of which are built entirely of wood or partly of wood and partly covered with stucco or brick veneer, or between all buildings which are more than two rooms deep and have side windows—16 feet.

Between buildings the walls of which are built of brick, brick veneer, stucco, hollow-tile, stone, or concrete, with fireproof roofing material, which do not exceed two rooms deep—9 feet.

Dwellings erected of stucco or frame or brick veneer must be either detached or semi-detached (*see* clause 2, *Maximum cost of dwellings, etc.*). In all cases hollow walls should be provided.

(*b*) *Sanitary Conditions and Ventilation*—Baths and water-closets should be provided in each dwelling, preferably on the bedroom floor. Baths and sinks should have hot and cold water. Water-closets should never open from a room, and should have a window opening to the outer air. Basements should not be used for habitation. Every habitable room should have at least one window opening to the outer air. Each room should have a window space of at least

one-tenth the floor area, and cross ventilation should be provided where practicable.

(*c*) *Height and Sizes of Rooms*—Rooms should not be less than 8 feet in height on the first floor and 8 feet over two-thirds of the floor area in bedrooms. One living room should not be less than 144 square feet, and two of the bedrooms not less than 130 and 100 square feet, respectively.

(*d*) *Height and Type of Buildings and Character of Construction*—Buildings should not exceed $2\frac{1}{2}$ stories in height, except in the case of cottage flats, which might be permitted to be three stories if constructed of fireproof materials. Houses should have 4, 5, or 6 rooms, and in exceptional cases, for large families, 7 rooms, excluding bathroom.

(*e*) *Conversion of Dwellings into Stores, etc.*—Provision should be made to prevent dwellings being converted into stores or used for any purpose other than a dwelling, except with the authority of the Provincial Government or other suitable authority, and only then on receipt of a petition of two-thirds of the owners and occupiers in the street in which the dwelling is situated. Brick, hollow-tile, stone, or concrete should be used as far as practicable, preference being given to those materials which are produced locally.

11. *Legal and Other Costs*—A special scale of legal costs should be fixed so as to reduce the expense of the transfer of land and houses. It would reduce architectural expenses if the Provincial Governments issued a series of model designs of suitable dwellings, with detailed drawings, bills of quantities, and estimates.

12. *Compliance with General Scheme, etc.*—All buildings should be erected in accordance with a general provincial scheme, and in compliance with the requirements of standard forms of specification and contract which shall have been previously approved by the Provincial Government.

Conclusion

The compulsory requirements in Part II of this memorandum have been kept down to the minimum of what is necessary to secure compliance with the Order in Council under which the federal loan is granted.

The suggestions in Part III are for the consideration of the Provincial Governments in preparing their schemes. They have been carefully considered and are put forward as minimum standards for health and comfort, and not as ideals that are difficult to attain. It is, therefore, hoped that the Provinces and Municipalities may be able to embody these suggestions in their schemes. Additional recommendations may be made from time to time as experience is gained, and comparative information is collected from different provinces.

To assist in carrying out the general objects in view, the experts of the Federal Government are available for conference with the officers and experts of the Provincial Governments regarding the details of schemes and preparation of general provisions or standards

and any other matters on which the officers of the Provinces may desire to confer.

All of which is respectfully submitted.

(Sgd.) N. W. ROWELL,
Chairman

IV—Form of Approval of Scheme.

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 20th February, 1919.

The Committee of the Privy Council have had submitted to them by the Housing Committee the General Scheme of Housing of the Province of Ontario accompanied by the following documents forming part thereof:

1. Circular of the Province of Ontario *re* Housing Proposition, dated December 12, 1918.

2. The proposed legislation to be enacted by the Legislature of the Province of Ontario.

3. Report of the Ontario Housing Commission, containing housing standards, and with plans, etc., of houses annexed.

The Honourable N. W. Rowell, Chairman of the Housing Committee, reports that the general scheme hereabove submitted by the province of Ontario conforms to the Orders in Council, P.C. 2997, of December 3, 1918, (Clause 4) P.C. 3067, of December 12, 1918, and P.C. 374, of February 20, 1919, and has been agreed upon by the said Housing Committee. He therefore recommends that advances be made to the said Government, under authority of Clause 7 of P.C. 2997, of December 3, 1918, for housing purposes in accordance with said Housing Scheme.

The Committee concur in the above recommendation and submit the same for approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council

Work of Committee on Lands

BY

F. C. NUNNICK

Agriculturist, Commission of Conservation

THE work of the Committee on Lands for the year 1918 has included the illustration work in Dundas county, and general publicity work.

ILLUSTRATION COUNTY WORK

The work during 1918 on the sixteen farms in Dundas county, where better farming methods are being practised, has been somewhat similar to that conducted in 1917. It has included:

System and methods of farming: embracing planning, crop rotation, seed and variety selection, tests of different thicknesses of clover seeding, tillage, live stock, and manure.

Labour, machinery, and equipment.

Business methods: selling, buying, co-operation.

Educational work: the schools, clubs, school fairs.

Results Apparent

The work has been very interesting. It has been possible to see the results of some of the work commenced in the previous year, such as the effect of the liming of land upon clover crop, and also in connection with the thick and thin seeding of clover seed, which seeding was made in 1917. Tests in tillage operations have also been conducted, the results of which were not obtainable until the crops were grown on the land during 1918.

Much interest in the work has been shown by the farmers themselves and also by their neighbours. When it became known that certain comparisons and illustrations were being conducted on these special farms, the neighbouring farmers looked forward with interest to the results of these tests. On this account a number of meetings were held on the illustration farms, to which all the neighbouring farmers were invited. These meetings proved to be of great interest and value. On the farm of Mr. Samuel Smyth a meeting was held which was attended by over 100 *bona fide* farmers. A short explanatory address was given by the Agriculturist of the Commission, after which a visit to the various fields was made and the results of

the different lines of work being conducted were viewed by those present. A general discussion, with questions and answers, took place. Some of the interesting things seen and discussed at this meeting were thickness of seeding of red clover, a comparison between northern-grown and home-grown seed, a comparison of results with sweet clover and common red, together with the manner in which they had survived the winter, a comparison between fall ploughing and spring surface tillage for the control of mustard, a seed plot of Dent corn, a comparison of potatoes grown from New Brunswick seed and home-grown seed. A tractor demonstration in cultivating and running the manure-spreader added to the programme of the afternoon.

Wet Weather Interferes

Some difficulties were experienced in our work during the past year. It was impossible to secure the varieties of corn desired for testing. During the autumn, the weather was so bad in Dundas county that some fields of corn were never harvested, and it was with extreme difficulty that any comparative results were obtained in connection with the potato crop; some of the fields rotted badly, and others were never dug at all. It was hoped to have a large number of fields of second-crop clover saved for seed, but the weather interfered with the early cutting of clover for hay and, consequently, the second crop was late. As the weather was so bad during September and October, the crops for clover seed matured very poorly. Weather conditions making the second crop of clover late, the clover midge did considerable damage; this also interfered with the obtaining of a seed crop.

The following extracts from the reports received by the Lands Committee from the farmers conducting illustration work in Dundas county speak for themselves and will, perhaps, be of more interest than anything else in the way of a report upon the work.

Samuel Smyth, Dundela, Ont.—"We are now sowing O.A.C. No. 21 barley, and find it the best variety we can get for our soil.

"I think the Irish Cobbler potato has come to stay; although not so heavy a yielder as the Green Mountain, it is less subject to rot. It is the best early potato we have.

"Previous to 1917 we had been sowing about 5 pounds of clover seed per acre.

In 1917 we seeded 17 acres at the rate of 10 pounds of clover and 8 pounds of timothy per acre. This gave a heavy crop in 1918, which we cut the last of June. We also had a heavy crop for seed, which I think, will give a fair yield.

"We have a better garden than we had previous to 1917. It was full of good varieties, which gave us everything in season.



SWEET CLOVER TEST ON AN ILLUSTRATION FARM IN DUNDAS CO., ONT.
In this picture, the man is shown standing in the seeding of common red and timothy.



SWEET CLOVER TEST ON AN ILLUSTRATION FARM IN DUNDAS COUNTY, ONT.
In this picture, the man is standing in the sweet clover, which came through the winter in much better condition than the clover and grass, though both seedings were sown under the same conditions and with the same nurse crop.

Face p. 134.

"In tillage trials we have found that where corn has been thoroughly cultivated and kept clean, we have had good results from surface tillage in the spring, previous to sowing barley or oats. The crop is freer from weeds and the yield equal to and, in some instances, higher than on spring-ploughed ground. We are following this practice principally to control mustard.

"O.A.C. No. 21 barley and O.A.C. No. 3 oats, which were used as a mixed grain crop, ripened at the same time, and gave an excellent yield. I think this is a mixture which will become popular, on account of the two grains ripening together, and on account of its requiring a short time to grow, both crops being early."

Durham Wells, Williamsburg, Ont.—"I have not been making a practice of sowing barley alone, but intend to do so since I have found such a good yielder as O.A.C. No. 21, introduced by the Commission of Conservation.

"I had been in the habit of sowing about 4 pounds of clover seed per acre, but I find that the higher seeding of 8 to 10 pounds per acre, along with the timothy, advised by the Commission of Conservation, is much better for our land. I had about double the yield on the thicker seeded portion.

"I have a better garden since selecting more suitable varieties, which give a better yield and prolong the season.

"I find that I cannot afford to put all my cultivation on my corn field, and keep it clean, and then plough it before sowing the next grain crop, which brings up a fresh crop of mustard seed to injure the grain crop. By keeping the corn ground clean, and discing only previous to sowing the grain, I find that mustard can be controlled to a large extent."

F. F. Davidson, Winchester, Ont.—"I find the O.A.C. No. 21 barley much better in quality and a higher yielder than what I had been previously sowing.

"Previous to 1917 I was sowing about 4 pounds of clover seed per acre, but, during 1917 and 1918, I sowed as high as 8 pounds per acre on certain portions of my fields. The increase in yield was about 33 per cent more on the thicker seeded portion than on the thinner seeding. I am quite satisfied that the thicker seeding of clover is profitable.

"During 1917 and 1918 I sowed vetches, rye and oats, or barley as a summer pasture mixture. The 1917 crop was extra good and I did not need it for pasture, so cut it for green feed. It helped also as a smothering crop to clean the ground.

"The O.A.C. No. 3 oats and the O.A.C. No. 21 barley, as a mixed grain crop, gave splendid satisfaction, ripening about the same time."

G. C. York, Morewood, Ont.—"Previous to 1917 I was sowing a mixture of different kinds of oats, of which I did not know the names, but since I have sowed American Banner oats I find them much more suitable than those previously sown as a main crop, and the O.A.C. No. 3 an excellent variety for an early crop.

"I am now sowing O.A.C. No. 21 barley, and find it a better yielder than the common barley I had previously been sowing.

" Previous to 1917 we were sowing about 5 pounds red clover per acre, but in 1918 I have sowed 10 pounds to the acre on a part of my fields and find a wonderful difference in the yield of hay. I am convinced that it pays to sow clover seed at 10 pounds per acre, or even more I think would pay."

Jos. Loughlin, Mountain, Ont.—" We have a bigger, better and much more profitable garden since 1917, when the Commission of Conservation introduced better and more suitable varieties of garden crops.

" Since 1917 I have found that there is a bigger profit in the change in the variety of potatoes than in any other seed introduced by the Commission. I have also found that by seeding clover thicker, I have a much better stand."

Thomas Johnston, Iroquois, Ont.—" I consider Banner oats a decided improvement on my old oats. The yield is better and the straw is stronger, causing it to stand up well. I think it is a good variety for this locality.

" The barley introduced by the Commission, which was O.A.C. No. 21, is better than that which I was previously sowing.

" I had been sowing about 4 pounds red clover seed to the acre, but in 1917 and 1918 I seeded some at the rate of 10 pounds per acre, with the result that the yield on the thicker seeded portion was at least double that of the thinner seeding. I am now decidedly in favour of the thicker seeding of clover.

" In 1918 I grew buckwheat on a field as a smother crop where quack was bad, and it has proved to be an excellent smother crop."

Orrin Strader, Brinston, Ont.—" The O.A.C. No. 21 and the O.A.C. No. 3 oats, introduced by the Commission, ripen more evenly together, and give better satisfaction than any mixture I have yet used.

" Previous to 1917 I had been in the habit of sowing clover seed rather thinly, but the increased yields from the thicker seeding conducted on my farm have convinced me that it pays to sow clover seed at the rate of 10 pounds to the acre."

Charles Marcellus, Chesterville, Ont.—" The oats and barley introduced by the Commission ripened well together and were fully 8 or 10 days ahead of the grain sown on the same day in the same field. I find this a very suitable mixture."

Arthur Nash, Morrisburg, Ont.—" I tried white sweet clover for pasture this summer and liked it very much.

" We found that discing corn ground instead of ploughing it gave a better crop of grain, a better catch of grass and clover, very few weeds, not quite so rank straw and, altogether, a better crop."

Arthur Christie, Winchester, Ont.—" We find that O.A.C. No. 21 barley is a heavier yielder and is earlier than the varieties which we had previously been sowing.

" We find that the thicker seeded part of our clover field yielded fully one-half more than the thinly seeded portion. I think it pays well to sow at least 8 or 10 pounds of clover seed per acre. We find a good mixture to be 8 pounds of red clover, 2 pounds alsike,

2 pounds alfalfa, 6 pounds timothy. It pays us to seed heavy with all grains, even if we do not need it or wish to have it for hay, as the clover tends to keep down weeds that would otherwise start after harvest. It also furnishes a large amount of pasture and, when ploughed down, furnishes the soil with humus."

Labour, Machinery and Equipment

During the winter months and the early part of 1918 a number of meetings were held in Dundas county, which were addressed by the Agriculturist of the Commission. Lantern views were shown, illustrating the more efficient use of the labour available on farms, and the use of labour-saving devices and equipment. Some of these convenient labour-saving devices were seen operating on farms during the past summer, as a direct result of their being illustrated at the meetings the previous winter. The writer knows of some instances where men went home from the meetings and, in the winter months, made some of these devices, which have worked very satisfactorily. Farmers are realizing more and more that if they are going to keep up with their work they must make the wisest use of their own labour and must study efficiency methods.

Business Methods

The agricultural surveys conducted by the Commission previous to 1917 revealed the fact that an exceedingly small percentage of the farmers were following any system of farm accounting. It is also true that the accounting systems offered the farmer are often too complicated for him to make ready use of them. That a simple system of accounting might be available to the farmers of Dundas, the Agriculturist of the Commission compiled a farmer's account book along simple yet efficient lines. This was published by the Commission of Conservation in 1918, and a copy sent to each farmer in Dundas county. Just previous to the sending out of this farmer's account book the Ontario Department of Agriculture conducted a thorough farm business survey in Dundas county. This survey is to be carried on annually, for a number of years, on the same farms. It will be interesting to note any difference in farm business methods in, say, three or four years' time, if the farmers are each year supplied with the simple account book published by the Commission. Extra copies of this book were published and sent to *bona fide* farmers applying for them. There continues a steady demand for this publication. It has proved very popular among the farmers, and those who, in other provinces, are conducting short courses for farmers have asked, in a number of instances, for copies of this book to be used as a text-book in instructing the farmers in farm accounting.

Educational Work through Schools, Clubs and School Fairs

Four school fairs were held in Dundas county during the year and, although weather conditions were unfavourable during September for school fairs, three were held when the weather was good. The fourth was postponed and, eventually, held on a rainy day; nevertheless a good crowd attended, and the exhibits were of a high order. Interest is being splendidly maintained in the school fairs in Dundas county. They are conducted under the Ontario Department of Agriculture.

Agriculture is now being taught in every rural school in Dundas, and by a greater number of qualified teachers each year. In 1917, Dundas County sent the largest class of teachers to Guelph for the short courses in agriculture of any county in Ontario. They sent a still larger class in 1918, and broke all records for the year, or any other year, as to the number of teachers from any one county taking a short course in agriculture at the O.A.C. Thus, a large majority of the Dundas County teachers are specially qualified for the teaching of agriculture in rural schools.

Miscellaneous Activities

The Commission of Conservation had a tent at the Winchester fair, containing an educational exhibit, which was visited by large numbers. Specimens of suitable varieties of farm crops being grown on the illustration farms were shown, and an automatic projector was used for showing pictures on a screen. This attracted much attention, the pictures being educational and along the lines of improved agricultural practice.

There are now four horticultural societies in Dundas county, making the county splendidly organized horticulturally. A new society has recently been organized at Iroquois, with over 65 members. This is a splendid record.

During the summer of 1918, an automobile excursion was again run from the county to the Experimental farm at Ottawa, where a very pleasant and profitable day was spent in viewing the results of the various lines of experimental work being conducted. Over 75 cars made the trip this year, bringing about 400 farmers and horticulturists from the county. The director and the members of the staff at the farm spared no pains in making the day a most profitable one to the visitors. It is intended to make this an annual event.

The society at Morrisburg held a successful horticultural exhibit on Labour day, combining with the Red Cross Society to make a gala day. The Horticultural Society put on the exhibit and the Red Cross Society looked after the gate. A large crowd attended and the receipts, together with the receipts from the various booths, amounted to over $3,500.



SMOTHER CROP TO KILL WEEDS

Buckwheat, sown thickly on well-cultivated land on the Illustration Farm of Mr. Arthur Nash, Dundas Co., Ont., completely killed out the couch grass, with which the field was badly infested.



CLOVER SEED CROP IN DUNDAS CO., ONT.

Clover was cut with the grain binder but left unbound. Cut in this way it is soon dry and ready to store for threshing. This crop was very profitable.

Face p. 138.

The Agriculturist has assisted, indirectly and directly, towards the betterment of agriculture in Dundas county, acting as judge at the horticultural exhibit at Morrisburg, the school fairs, and at the children's exhibits at the fall fairs, etc.

Farmer's Handbook

Early in the year a *Handbook for Farmers*, especially prepared for the farmers of Dundas county, was published by the Commission. This is a pamphlet of 51 pages, with chapters on tillage, seed selection, clover growing, manures, weeds, insects, plant diseases, etc. It is written in language which every farmer can understand and which, if made use of, will be of great service to the farmers of Dundas county, or of any county where the conditions are similar to those of Dundas. As in the case of the *Farmer's Account Book*, a number of extra copies were printed and have been distributed upon application.

During the year the Agriculturist has assisted in the work of the Organization of Resources Committee for eastern Ontario, and was one of the judges for the garden competitions of the Ottawa Horticultural Society.

About thirty meetings were addressed, upon request, by the Agriculturist during the year at various points along agricultural, horticultural and farm business lines. Articles have been written for publication in *Conservation*.

59873—10½

Committee on Forests

BY

CLYDE LEAVITT

Chief Forester, Commission of Conservation

WITH reconstruction the order of the day, it is peculiarly fitting to consider the importance of the forest in the economic structure of the country, and to formulate plans for maintaining and increasing that importance.

Part of Forests in the War

Canada's forests have played an important part in winning the war, particularly in the supply of aeroplane spruce and timbers for shipbuilding. The overseas production of timber by the Canadian forestry corps is reported to have saved ocean tonnage equivalent to feeding fifteen million people. Incidentally it may be remarked that these men, lumbermen and trained foresters, will return to Canada with a tremendously increased realization of the importance of forests, in both war and peace, and an entirely new viewpoint, in most cases, as to the vital part which scientific forestry practice has played, previous to the war, in maintaining the productivity of European forests, particularly in France. It is to be anticipated that this liberalized outlook will have a notable reflex action on the general state of public sentiment in Canada, resulting in a direct stimulus toward the adoption of improved methods for the more adequate perpetuation of our forest resources.

Statesmen and business men have repeatedly emphasized the part that the further development of our natural resources must play in reconstruction after the war. Any such programme must take full account of the forests. Such increased development will assist materially in providing against unemployment, through the building up of new forest industries, in addition to the 5,000 wood-using industries already in existence. It will be a large factor in stabilizing economic conditions generally.

Export Trade Necessary

A large export trade is particularly essential to Canada, to redress her unfavourable trade balance. In this direction, our forests hold a position of peculiar strategic importance, both actual and potential. In British Columbia, for example, it has been shown that the annual lumber cut can be increased five-fold, under good management, without

impairing the forest capital stock. This means an enormous export trade to which the shortage of shipping is still the greatest obstacle.

The present and potential value of Canada's export lumber trade is indicated by the order recently placed by Great Britain for lumber from Canada, aggregating $40,000,000 in value. In the east, the value of our pulpwood forests is indicated by the fact that the exports of pulp and paper now total around $60,000,000 annually. One-fourth of the newsprint and fifteen per cent of the pulp-wood used in the United States comes from Canada.

Our forests have a wealth-producing capacity, the possibilities of which have as yet been realized only in small part. To transmute these possibilities into permanent actualities requires, however, the general acceptance, by the people in general, and by governments in particular, of the fundamental principle that the forest is a crop rather than a mine, and that cutting operations on non-agricultural lands must be conducted always with a view to the perpetuation of the forest as such.

Practice of Silviculture

The practice of silviculture is still in its veriest infancy in Canada, as it is over most of North America. There is still far too strong a tendency towards the practice of forestry anywhere except in the woods. At the same time, it must always be realized that forestry is essentially a business proposition, and that business considerations place definite limitations upon what it is feasible to do in the direction of intensive methods.

On the other hand, the forest lands of Canada are predominantly Crown lands, and are, therefore, for the most part the property of the people of the country. It follows that the public interest, from a long-time viewpoint, should govern in determining the conditions under which exploitation takes place. With the present increased stumpage values, many things in the direction of better management are becoming economically feasible which would have been out of the question in years past.

Notwithstanding war conditions, truly remarkable progress toward better forest conservation has been made during the past year. Mention of these developments may serve to accentuate the respects in which action is still most urgently required.

New Brunswick

New Forest Legislation

The outstanding development of the year in New Brunswick has been the enactment of new forestry and forest fire legislation. This involves the complete reorganization of the provincial forest service, combining under

the direction of the Provincial Forester all the work having to do with forest protection, forest survey and land classification, enforcement of cutting regulations on Crown lands, scaling of timber, and enforcement of the fish and game laws. Thus, in at least some respects, the responsibilities and, therefore, the opportunities of the New Brunswick Forest Service are more inclusive than are those of any other forest organization in Canada, Dominion or Provincial.

The levying of a fire tax, supplemented by direct appropriations from the provincial treasury, provides funds to support what should prove a thoroughly efficient service. The possibilities in this direction are greatly increased through the adoption of the merit system of appointment, under civil service restrictions. This plan has already proved its vast superiority over the old system of patronage appointments.

In his report the Provincial Forester acknowledges assistance rendered by the Forestry branch of the Commission of Conservation, as well as by other foresters in public and private employ, in the drafting of the new legislation.

Disposal of Timber Areas

An interesting development, concerning which representations were also made by the Commission, has been the adoption of a new policy in the disposal of limited areas of timber, as at least a partial substitute for the licensing system formerly in exclusive effect. This is the timber sales policy, which is already in effect as to comparatively small blocks of timber in British Columbia, and is the only system of timber disposal on the unlicensed portions of Dominion forest reserves. On the National forests in the United States there is nothing comparable to the Canadian system of licensing, and the timber sales basis is the only one under which timber is disposed of for commercial purposes. This differs from the licensing system, in that the time set for removal of the timber is strictly limited, varying with the size of the tract, instead of being renewable from year to year, theoretically in perpetuity. Also, the price is determined by competitive bidding, on a stumpage basis only, instead of payments being made in the form of stumpage, ground rent, and bonus combined. The advantage to New Brunswick, from the financial viewpoint alone, on the 400 square miles put up for disposal on the timber sales basis, has been that the price received has been more than double that on the licensing basis, varying between $5.50 and $7.75 per M., instead of a former average revenue, under the old system, for spruce, calculated at slightly less than $3.00 per M.

The work of forest survey and land classification has necessarily been retarded, due to war conditions. Nevertheless, examinations during the year covered 465,000 acres, making a total to date of 1,665,000 acres, or 22.2 per cent of the total Crown land area. The past year's work was done at a cost slightly over three cents per acre, all items of cost having increased; the value of the work was also increased through the permanent establishment of block lines by deputy land surveyors.

Nova Scotia

Early in December last a conference was held at Halifax, under the auspices of the Canadian Forestry Association. This meeting was attended by representative men in public and private life, interested in improving forest conditions in Nova Scotia. The relatively severe forest-fire losses of the province during 1918 gave point to the discussion of the appointment of a Provincial Forester, for which legislative provision was made in 1913, the position never having been filled, however, due to lack of available funds. It was recognized that, while the forest fire laws are in many ways most excellent, material improvements might be made in actual administration were adequate funds available.

Campaign of Education

The need was also pointed out for an educative campaign among the people of the province, looking toward improved methods of forest-fire prevention and control, and, in particular, for the delivery of lectures before the general public throughout the province, as well as at one or more representative educational institutions, calculated to bring about a better understanding of the best methods of perpetuating the forests by wise use. The large percentage of forest held in small ownership, particularly as farm wood lots, renders this particularly desirable, as has previously been pointed out by Dr. Fernow. Nearly all the lands of the province are in private ownership, so that the opportunity in connection with the administration of Crown lands is very limited. Further, were a Provincial Forester to be appointed, the prevention of fires along railway lines might be greatly facilitated through co-operation with the Dominion Railway Commission, as is already being done in all the other provinces of Canada.

It is greatly to be hoped that some feasible plan of co-operation can be developed between the Provincial Government on the one hand and the timber owners on the other, supplemented by partial support from some educational institution, possibly the Agricultural College at Truro, and involving also the designation of the Provincial

Forester as an officer of the Dominion Railway Commission. Action along these lines would unquestionably mean much for the future of forestry in Nova Scotia.

Quebec

The logic of organization has been followed by placing under the Provincial Forest Service the administration of forest fire protection, including relations with the forest protective associations, the fire-ranging system outside association territory, and the railway fire protection work of the Railway Commission. Appropriations have been greatly increased, and the whole situation is on a much more stable basis than before.

Forest Fire Protection

The situation with respect to forest fire protection has improved steadily. Approximately eighty per cent of the licensed timber lands of the province are within the territory protected by the St. Maurice Valley, Ottawa River, Laurentian and Southern St. Lawrence Forest Protective Associations, the efficiency of whose work has increased steadily, through improvements in personnel, education of the local public, the increased use of modern equipment, and the development of improved means of transportation. These associations combine both private and public functions, the officials being under appointment as officers of the Crown.

An amendment to existing legislation is contemplated, which will have the effect of compelling an adequate fire patrol on licensed lands not already so provided. Not all limit-holders within association territory are members of the associations, and, in at least some of such cases, it is reported that adequate patrols are not maintained, thus constituting a hazard to association members and to the interests of the Crown. The legislation under consideration is essential to the public interest.

Extension of Forest Fire Patrol

During the year, the Provincial Forest Service has established a fire-ranging system in the Abitibi district, along the Transcontinental railway, between Parent and the Ontario boundary, and to the north of the territory covered by the Ottawa River Forest Protective Association. A railway patrol was provided, in addition to fire-rangers in the back country. The Provincial Forester reports that, in this district alone, some 18,500 acres of settlers' slashings were burned under permit, with no loss of green timber and only an exceedingly slight loss of other property.

The Provincial Forest School at Laval University has been combined with the School of Surveys, resulting in the strengthening of instruction along engineering lines.

Ontario

Ontario's new Forestry Branch has now passed its second year in charge of forest fire protection, with constantly increasing efficiency and gain in public confidence. A good beginning has been made at sifting the personnel. The maximum number of rangers was 1,044, for the month of July. These are under 32 district chiefs, assisted by 41 deputy chiefs. Four inspection districts have been established, with headquarters at Cochrane, Nipigon, Sudbury and Parry Sound. The general superintendent of fire protection exercises general field supervision, with headquarters at Sudbury, under the Provincial Forester, who is stationed at Toronto. It will thus be seen that the organization is a very large one, requiring extreme care in supervision and inspection. The annual appropriations for the branch aggregate $500,000.

Young Growth Destroyed

The season of 1918 was, on the whole, favourable for fire control in Ontario. It is significant that, of the 30,172 acres burned over, 60·5 per cent, containing more or less young growth, was logged-off land, with resultant hazardous slash. The necessity for taking vigorous hold of the problem of disposal of logging slash is becoming more and more urgent.

During the year, 9,590 permits were issued, principally for settlers' clearing fires, an increase of 175 per cent over 1917. There were five prosecutions and five convictions for burning without permit.

Of new trails, 304 miles was constructed, in addition to 58 rangers' cabins, 12 lookout towers, and other important improvement work. The major items of equipment added during the year comprise 5 automobile trucks, 5 portable fire-fighting pump units, 4 large boats, 3 railway motor cars, 36 railway velocipedes, 100 tents, 65 canoes, and 1,835 pounds of blankets. Thousands of fire-warning signs were posted, and a vigorous educational campaign was conducted along lines of fire prevention. These items are enumerated, simply to show that this comparatively new organization is taking its responsibilities seriously, and that a new era in forest fire protection in Ontario has actually arrived. That this is good business policy for the province is indicated by the fact that its forest revenue from Crown lands is nearly $2,000,000 annually.

Civil Service Regulations Inadequate.

Ontario has made a start toward civil service reform, through the appointment of a Civil Service Commissioner. In the outside service, however, the authority of this officer does not extend to positions carrying an annual salary of less than $1,000. Thus, the fire-ranging staff does not come within the scope of the new act, since most of these men are employed for the summer season only. Field staffs on similar work are now under civil service regulations in British Columbia and New Brunswick, and on Dominion Crown lands in the west. It would seem that some similar arrangement might prove quite feasible in Ontario, notwithstanding the admitted difficulties.

From the viewpoint of perpetuating the forests of the province through wise use, the one step now most imperatively required is the transfer to the Provincial Forestry Branch of supervision over cutting operations on all Crown lands. This branch is in charge of trained foresters, who have thoroughly demonstrated their administrative capacity. Additional foresters of mature experience would, of course, be necessary, for work in the field, but these can be secured, though it must be said that the number available is still limited. Technical forest organizations are in full charge of cutting operations on Crown lands in British Columbia, Quebec and New Brunswick, and in the Dominion forest reserves, exclusive of licensed lands. The United States Forest Service, a highly technical organization, has full charge of all cutting operations on some 160,000,000 acres of National forests. Leaving technical work of this kind in non-technical hands means simply that the forests are administered primarily for immediate revenue only, and the question of providing for a future crop does not, and in the very nature of the case can not, receive anything like adequate attention, if any at all. It is unthinkable that Ontario should much longer lag behind other provinces in a matter which so vitally affects the future interests of the people as a whole.

Dominion Lands

Abolition of Patronage

The outstanding development of the year has been the general abolition of the patronage system of appointments in all the public services of the Dominion Government. Both the field and head office staffs of the Dominion Forestry Branch are, therefore, now under the merit system of appointment, under civil service regulations. This fundamental reform has been advocated by the Commission of Conservation for years past, it having been pointed out repeatedly that the patronage

system of making appointments, particularly in the field staff, was the greatest single obstacle to efficiency in the protection and administration of Dominion Crown timber lands. The beneficial results of the new policy are already plainly evident, and will become increasingly so in future years.

To a certain extent, Dominion forest officers are dependent upon provincial legislation in matters affecting forest fire protection on Dominion lands, outside the forest reserves, in the western provinces. Reference was made at the last annual meeting of the Commission of Conservation to the passage of improved forest fire legislation by Saskatchewan and Manitoba. British Columbia already had an admirable forest act, applicable, so far as necessary, to the situation as it affects Dominion lands in the Railway Belt and Peace River Block of that province.

Attention was also called, at the same time, to the urgent need for a complete revision of the fire legislation in Alberta, to make it more applicable to the forest sections in the northern portion of the province, where considerable new settlement has been taking place. Much damage has been caused by the spread of settlers' clearing fires, and the adoption of the permit system of regulating such fires is imperative, for the protection of the public interest. Such legislation is now in effect in all the other forest provinces, and has demonstrated its usefulness beyond any question.

Another point which should be covered by provincial legislation is the situation with respect to some 350 miles of provincially-chartered railways in Northern Alberta.* These lines are not subject to the jurisdiction of the Dominion Railway Commission, nor is there adequate provincial legislation imposing requirements relative to the prevention and control of fires due to railway agencies.

Revision of Prairie Fires Ordinance

It is reported that the revision of the Prairie Fires Ordinance is now under consideration by the Alberta Government.* It is to be hoped that these points will receive favourable consideration at the forthcoming session of the provincial legislature, along lines concerning which the Commission of Conservation has previously made representations.

There is still one fundamental point, concerning which action by the Dominion Government is vitally necessary in the public interest. Attention has been called, in successive reports of the Committee on Forests, to the administrative anomaly which prevents the Dominion Forestry Branch, a technical organization, with a staff of trained foresters, from having any hand in the enforcement of technical

* See footnote, p. 28.

cutting regulations on licensed timber berths on Dominion lands, whether inside the forest reserves or out. The licensed timber berths naturally comprise the bulk of the accessible merchantable timber on Dominion lands, and cutting operations on these berths have, from the beginning, been conducted as though the forest were regarded as a mine rather than as a crop, notwithstanding the provisions of Section 58 of the Dominion Lands Act. In other words, the present interest of the operator has been the primary consideration, rather than the permanent interest of the general public, to whom the lands belong. The methods of cutting are destructive, rather than constructive, and the administrative machinery of the Government, as to these lands, has been primarily directed toward securing revenue, with no adequate provision for seeing that cutting operations are conducted in a manner calculated to leave the area in a productive condition. The anomaly of this situation is complete, and should receive consideration in any proposed scheme of departmental reorganization.

British Columbia

The British Columbia Forest Branch, like other similar organizations, has been greatly hampered by the absence of a large proportion of its technical staff on war work, both overseas and at home.

Timber testing Laboratory Established

Attention was called, in the last report of the Committee, to the urgent need for a timber-testing laboratory on the Pacific coast. This project was carried out, before the conclusion of hostilities, under a co-operative arrangement between the Dominion Forestry Branch, the Imperial Munitions Board and the University of British Columbia, and a start was made on war work, principally the testing of timbers under consideration for aeroplane manufacture. It is understood that the plant will be continued, primarily by the Dominion Forestry Branch, in co-operation with the University of British Columbia, along somewhat the same lines as the Dominion Forest Products Laboratories at McGill University, Montreal, but confining itself, on a smaller scale, to the local problems of wood utilization and to those more general problems which cannot be handled more advantageously at Montreal

Last spring, a forest ranger course for returned soldiers was inaugurated at Vancouver, under a co-operative arrangement between the Vocational Board, the Dominion Forestry Branch, the British Columbia Forest Branch, and the University of British Columbia. This winter an extended course is being given, financed primarily by

the Vocational Board. The project is a splendid one, and it is to be hoped that arrangements can be made for its continuation.

The Provincia Forest Branch contracted for the use of a hydroplane, to be used for fire patrol in the coast district. The machine was, however, destroyed through accident, fortunately without seriously injuring the aviator. A new machine is being secured, and will be tried out during the coming season.

The Forest Branch is using a considerable number of light automobiles and gasolene launches in patrol work, with excellent results.

The Provincial Forester announces that a large quantity of logging slash has been burned by the Forest Branch, thus reducing the fire hazard to surrounding timber and private property.

Aircraft for Forestry Work

A great deal of attention is being devoted, throughout the world, to the development of peace-time uses of aircraft. That there will be many such uses requires no argument.

Aeroplane Fire Patrol

Among the possibilities are forest fire patrol and aerial photography. It is expected that fire patrols by flying boats will be established during the current year by the British Columbia Forest Branch and by one or more of the Forest Protective Associations of Quebec, assisted by the Quebec Government. The St. Maurice Forest Protective Association is the leader in this respect in the east, as the British Columbia Forest Branch has already proved in the west. There are also large possibilities for aerial fire patrol on Dominion lands in the west, through the Dominion Forestry and Parks Branches. Many men, whose experience in aviation overseas should qualify them to express thoroughly practical opinions, state that, beyond question, these things are eminently feasible.

Aerial Photography

Similarly, there is a large field for development in aerial photography, both in conjunction with forest protection and independently. The recent address of Colonel Cull, before the Geodetic Society of Ottawa, showed some of the possibilities of aircraft in furthering the line of work with which the Geodetic Survey is particularly concerned.

The possibilities in connection with forestry work are also very great. There are vast areas of relatively inaccessible lands in all our provinces, where only fragmentary data are available as to drainage and topography, or as to the extent, composition and volume of the forests. As a result of war developments, the importance of our

forests in the national economy is now recognized as never before. An adequate knowledge of their character, situation and extent is essential to the proper administration and exploitation of this vital resource.

Surveys of Forest Resources

The Commission of Conservation made a survey of the forest resources of British Columbia and Saskatchewan, although the data available as to extensive areas were of the most fragmentary character. Similar work in other provinces is planned, as rapidly as the necessary funds can be secured. The prosecution of such projects would be enormously simplified, and the results would be much more accurate and valuable, if necessary work on the ground could be supplemented by systematic surveys made by means of aerial photography. Such surveys might of course serve other public purposes as well. This suggests the extreme desirability of co-operation between all agencies interested, Dominion and Provincial, as well as private.

The public interest involved in all these questions is undoubtedly very great. If adequate developments along these lines are to be anticipated on a par with those planned in other countries, it would seem logical that the Dominion Government should take the lead in making the necessary plans and in providing the equipment and personnel required. Aside from purely Dominion projects, there is a very considerable field for co-operation with provincial agencies in lines of work more or less affecting the public interest as a whole.

Railway Fire Protection

The fire protection situation on Government railways has improved materially, though the Government still does not, as yet, accept the same responsibility that it imposes upon privately-owned lines subject to the jurisdiction of the Railway Commission. Too much is still left to provincial or private action, in the maintenance of patrols and extinguishing of fires; and adequate specialized supervision, to secure full compliance with the instructions issued by the management with respect to the prevention and control of fires occurring along the line, is still lacking.

In Quebec, New Brunswick and Ontario, patrols have been maintained along Government railway lines by the Provincial Forest Services and co-operative associations, the railway management contributing only about one-third of the cost.

In Manitoba, between Elma and the Ontario boundary, the Transcontinental railway has maintained a special patrol at its own cost, thus accepting its full responsibilities in this particular case.

Credit is, however, due the railway management for the maintenance of fire-fighting tank cars at a number of points in Quebec and New Brunswick, and for the permission given provincial forest officers in New Brunswick and Quebec, and Dominion Forestry Branch officers in Manitoba, to inspect fire protective applicances on Government railway locomotives. There is no apparent reason why a similar arrangement should not be made in Ontario, parallel to the one already in effect in that province on the Timiskaming and Northern Ontario railway.

Fire Protection on Government Railways

The recent amalgamation of the Government railways and the Canadian Northern system into the Canadian National railways has not extended the jurisdiction of the Railway Commission over the former Government railways. On the other hand, the Canadian Northern portion of the Canadian National Railways system retains its corporate status, and is thus still subject to the Board of Railway Commissioners. The Government is, however, definitely committed to placing under the jurisdiction of the Board the Transcontinental and Intercolonial and other lines formerly known as 'Government' railways. In the interest of fire protection, it is desirable that this action be taken at the coming session of Parliament.*

The jurisdiction of the Railway Commission now extends to approximately 85 per cent of the railway mileage of Canada. Measures relative to fire protection along these lines are prescribed and inspected by the fire inspection department of the Board, under a co-operative arrangement with the Dominion and Provincial fire protective agencies on the ground. Labour shortage, due primarily to the war, has considerably retarded right-of-way clearing operations, thus increasing the fire hazard; also, the railways have faced many difficulties in securing men for fire-patrol, to say nothing of section crews. With the gradual return of normal labour conditions, the situation in these respects may be expected to improve steadily. On the whole, however, fire losses due to railway agencies have remained quite satisfactorily low, with some local exceptions.†

*See footnote p. 30.

†Preliminary reports show that, during 1918, 1,144 fires originated within 300 feet of the track, in forest sections, along railways subject to the jurisdiction of the Railway Commission. Of these seventy-eight per cent is definitely attributed to railway causes, seven per cent to known causes other than railways, and fifteen per cent to unknown causes. Of the 897 fires attributed to the railways, forty-three per cent was small, doing no material damage. The remainder, 513 fires, or fifty-seven per cent, burned over 57,616 acres, causing a property loss valued at $67,880. Of the latter figure, approximately half is due to fires along the Halifax and South Western Railway in Nova Scotia, where there is no local rail-

Canadian Forestry Association

The Canadian Forestry Association has been active in disseminating educational propaganda along forestry lines in all the provinces, particularly in the east. Through co-operation with the Railway War Board, a special car was provided and equipped with educational exhibits. Lecturers were provided, through co-operation with Provincial, Dominion, and private forest organizations, and lecture trips were made to numerous points in Ontario, Quebec, New Brunswick, and Nova Scotia. This work should be continued and extended, if possible, to the western provinces.

The Forestry Association is doing a splendid work along many lines, and is worthy of the greatest possible support from Dominion, Provincial, and private agencies. It has become a very definite force in the direction of getting things done along the lines of forestry and fire protection. Its usefulness would be greatly increased by the establishment of a branch office in the west, possibly at Vancouver, and it is to be hoped that the necessary financial support may be made available to this end.

Wood Fuel

Last winter the Commission of Conservation, with other agencies, urged increased production and consumption of wood fuel, as an insurance against the expected shortage of coal for domestic heating. As a result of both municipal and private action, a materially increased production of wood aided in tiding over the shortage of anthracite coal.

Municipal Fuel Supplies

In preparation for the current winter, a number of municipalities, particularly in Ontario, went definitely into the wood business, primarily as a matter of insurance. The Ontario Government provided wood from Algonquin park for the heating of public institutions, and offered, also, free stumpage to any Ontario municipality desiring to secure wood fuel from that park.

---

way fire inspection, and where the weather conditions last year were unusually favourable to the spread of fires. Fires of known origin other than railways burned over 1,798 acres, valued at $26,527. Fires of unknown origin burned over 5,177 acres, valued at $8,009

The total number of fires reported as originating within 300 feet of track was 47 greater than in 1917. The area burned over was, however, 9,643 acres, or thirteen per cent, less than in 1917; and the damage done was $3,252 (3.1 per cent) less than the total estimated damage done by all fires originating within 300 feet of railway lines during 1917.

A very large amount of wood fuel has been produced and consumed, notwithstanding the difficulties due to labour shortage, high wages, freight congestion, and high freight rates. Had the war continued, and had the severity of the present winter been comparable with that of last winter, the wood fuel campaign would have aided very considerably in lessening distress due to the fuel shortage.

As it is, the experience of the two winters has shown that wood fuel has legitimately a larger place in domestic economy than it had previously enjoyed, and that, in case of emergency, the hardwood forests of eastern Canada constitute a valuable bulwark against possible fuel shortages in the future.

Wood should be Sold by Cord

Selling wood only by the load, rather than by the cord, has placed wood fuel at a material disadvantage, since purchasers have no practical means of knowing what quantity they get for their money. This practice naturally favours short measure, where the seller is so inclined. It would be greatly in the public interest were the Dominion Government to require wood fuel to be sold only by the standard cord of 128 cubic feet, or fraction thereof.

White Pine Blister Rust

The Department of Agriculture has continued research and scouting work during the year. No new districts of general infection have been found. The disease has a firm foothold in the older settled portion of Ontario south of lake Nipissing, and it has been found in a considerable portion of the settled part of Quebec, on both sides of the St. Lawrence, but in the *ribes* (currant and gooseberry) stage only. No trace of the disease has yet been found in New Brunswick, northern Ontario, Manitoba or British Columbia.

General eradication in eastern Canada is considered impracticable, but experience in both the United States and Canada has shown that local control measures, for the protection of specific areas of pine, are quite feasible, at a cost that is not prohibitive, considering the property values at stake. This work involves the eradication of wild and cultivated currants and gooseberries in and near the area to be protected. Cultivated black currants constitute the most serious of the alternate hosts of this fungous disease.

Ultimately, the responsibility for local control measures must rest with timber-owners. However, the Dominion and Provincial Governments have a responsibility to conduct research, as to the best means of control, and to continue scouting, to determine the location

of infestations, and the rate of spread. The splendid research work on this disease by the Dominion Field Laboratory of Plant Pathology at St. Catharines, Ont., should be continued and extended. The appropriations of the past year should be continued by the Dominion and Provincial Governments.

Protect Western White Pine

To keep the disease from the western white pine areas of the Pacific Northwest, an order in council, under the Destructive Insect and Pest Act, should be passed, prohibiting the movement of currant and gooseberry plants, or other *ribes*, from infected districts in the east, into the Prairie Provinces or British Columbia. A similar embargo has been placed by the United States Government, and action by Canada is necessary in the interest of both countries. It is, of course, to be anticipated that nurserymen will object, but the amount of actual business that would be cut off by such an order would be infinitesimal, particularly in comparison with the value of the western white pine.

It is necessary to repeat a recommendation previously made, namely, that the protection of our forest resources urgently demands the appointment of a forest pathologist, who shall study the fungous and other diseases of forest trees in co-operation with the chief of the Division of Forest Insects of the Entomological Branch. The valuable work accomplished by the Entomological Branch has served to emphasize more strongly than ever the need of similar and coördinated work in the fungous diseases, and we would urge the appointment of such an officer by the Department of Agriculture.

Forest Planting

In all the provinces of Canada, there are large areas of non-agricultural lands which have been so completely denuded of forests by unwise methods of cutting, or by fire, or both, that they are in a wholly unproductive condition, due to the complete destruction of all young growth and seed trees. Only by planting can such lands be restored to productivity within reasonable length of time, and thus be made to play their proper part in the economic life of the country.

Commercial Forest Planting

Nowhere in Canada has such an excellent start been made toward commercial forest planting as in the province of Quebec, and even here the work done constitutes only a small beginning, in comparison with the real needs of the situation. The lead in this direction has been taken by the Laurentide Company and the Riordon Pulp and Paper Company. Both companies have, for some time, realized the slow progress which

nature, unaided, makes toward restoring the stand of commercially valuable pulpwood species on our northern lands after they have been heavily cut over.

The Laurentide Co. is the pioneer, having commenced planting operations in 1908. Up to the present, a total of 453 acres has been planted by this company, mostly with Norway and white spruce, with a smaller representation of white pine, Scotch pine, red pine, poplar and other minor species. About 1,500 trees are planted to the acre, so that the total number planted to date aggregates some 680,000. During 1919, the Forestry Division of the Laurentide Co. expects to plant about 500,000 young trees, mostly Norway spruce and white spruce. The programme for 1920 includes the planting of 700,000 trees and, for 1921, 1,000,000 trees, mostly white spruce. The rate of planting is to be increased until it totals 2,000,000 trees per year.

The Laurentide Co. has, in its forest nurseries near Grand'mère, Que., nearly 4,000,000 seedlings of different ages, to be used in planting operations between 1919 and 1921. These will be supplemented by purchases from other nurseries, until the capacity of the Grand'mère nurseries can be increased to cover the entire planting programme of the company. The company's forester, Mr. Ellwood Wilson, reports that the cost of planting, usually with 3-year-old seedlings, is from $9 to $10 per acre.

The Riordon Pulp and Paper Co. began its reforestation work in 1916, its forest nursery at St. Jovite, Que., being established the following year by their forester, Mr. A. C. Volkmar. To date, a total of 780 acres has been planted to Norway spruce, white pine, red pine, white spruce and Scotch pine. In the nursery at St. Jovite are 2,180,000 Norway spruce seedlings, 800,000 white spruce, and 200,000 white pine, of different ages. By 1920, it is expected that the scale of planting will be increased to 1,000,000 spruce and 100,000 white and red pine, and that operations will be continued at this rate, using 3-year-old stock.

Both these companies are confining their planting operations to lands owned by them in fee simple, readily accessible to existing means of transportation. This will give the plantations a high value when the timber reaches commercial size. In order, however, to encourage large-scale planting on private lands, it is imperative that provision be made against excessive taxation. A low annual tax rate, with an added tax when the crop is finally harvested, is most just to all concerned.

59873—11½

Reforestation of Crown Timber Lands

The reforestation of denuded Crown timber lands is a problem of large proportions, the solution of which belongs primarily to the provincial governments. The Quebec provincial forest nursery at Berthierville, which has been in existence for nine years, has supplied millions of young trees to private land owners, mostly farmers and pulp companies, including 2,000,000 trees sold during 1918. The Provincial Forester, Mr. G. C. Piché, announces that the capacity of this nursery is to be increased to an annual production of 5,000,000 young trees, partly in contemplation of the Provincial Government adopting a programme of forest planting on denuded Crown timber lands.

It is understood that the Ontario Government also has under consideration the establishment of an extensive programme of reforestation upon denuded Crown lands, accessible to transportation. The provincial forest nursery at St. Williams, Ont., could readily be extended to provide the necessary planting stock. Such action is imperative if large areas of lands suitable for no other purpose are to be restored to a productive condition. Experience proves that reforestation of waste lands is a desirable feature of public policy; it pays financially and is vitally important in supporting the economic structure of the country.

Slash Disposal

Attention has been repeatedly called, during the past seven years, to the serious fire menace resulting from the great accumulation of inflammable debris from logging operations. This subject has attracted much discussion, and the time is rapidly approaching when it must receive some specific attention at the hands of the administrative organizations.

Compulsory Slash Burning

At present, however, so far as known, the only compulsory slash disposal in connection with logging operations on Crown lands in Canada has been on timber sale areas on unlicensed lands in the Dominion forest reserves. On some of the Indian reservations administered by the Dominion Dept. of Indian Affairs, slash disposal has also been required as a stipulation in timber sales.

In British Columbia, there is no compulsory slash disposal on licensed lands, though many operators, particularly in the Coast district, have burned slashings voluntarily or as a result of the educational campaign of the Provincial Forest Branch. Such burning operations are, of course, done under permit and under control.

The United States Forest Service, as a matter of course, requires slash disposal as one of the essential terms in timber sale contracts.

It must be borne clearly in mind that the real problem has not yet been actually undertaken, on any material scale, anywhere in Canada. Only by definite governmental requirements is there any real likelihood that it will be solved generally.

Our forest fire losses, great as they are, have now been reduced to a point where they are dwarfed by the losses due to attacks by insects and fungi. Expert investigations have proved that the logging slash in our forests constitutes a breeding ground for destructive insects and fungi, and that the systematic disposal of such slash would reduce very greatly the heavy losses due to these agencies. Thus, the argument for slash disposal is at least three-fold, rather than single.

Experience in the United States shows that, where winter logging is the rule, slash can be burned, in the snow, as logging proceeds, and as an integral part of the operation. Under these conditions, the added cost, on a pre-war basis, is generally about 50 cents per thousand feet, or 25 cents per cord, where the work is properly supervised, and the men are experienced and in sympathy with the operation. This should be regarded as one of the elements of logging costs, and should be taken into consideration in fixing stumpage charges.

Settlers' Clearing Slash

The safe disposal of settlers' clearing slash is now generally accepted as essential, in the public interest. In many sections of eastern Canada, settlers in forest districts make a regular practice of cutting pulpwood on their lands during the winter. In many cases, the resulting slash might be most advantageously burned in the snow, as cutting proceeds, as is above suggested for regular logging operations. In a section like the 'Clay Belt' of Ontario and Quebec, for example, such a policy would materially reduce the danger of such conflagrations as caused the loss of some 325 lives in the Clay Belt fires of northern Ontario in 1916, and one thousand lives in the Minnesota disaster of the past summer.

Saskatchewan Report

It is now confidently expected that the report upon the forest resources of Saskatchewan by J. C. Blumer will be ready for publication at an early date. This report will show conclusively that the amount of merchantable timber in Saskatchewan is far below the older estimates, enormous areas of splendid forest having been destroyed by fire during the past hundred years. Great areas of young forest growth exist, however,

so that the promise for the future is bright, provided the fire loss can be kept within reasonable bounds from now on.* This necessarily means the continued expenditure of considerable sums for an adequate fire-ranging staff.

Acknowledgment is due the Dominion Forestry Branch for the splendid co-operation afforded Mr. Blumer in the collection of data for his report.

British Columbia Report

The report upon the *Forest Resources of British Columbia*, by Dr. H. N. Whitford and R. D. Craig, will be ready for distribution immediately. This report will set a new high standard for work of this character, upon this continent.

Ontario Forest Resources

The survey of the forest resources of Ontario, for which tentative plans were made more than two years ago, will shortly be commenced. The delay in taking up this project was due primarily to the demand by the Imperial Ministry of Munitions for the services of R. D. Craig, to take charge of the inspection of aeroplane spruce lumber in British Columbia, the production of which was greatly increased by the Imperial Munitions Board, under Major Austin Taylor, assisted by H. R. MacMillan. It is now a matter of history that the production of aeroplane spruce was increased many hundred per cent, constituting a war service of prime magnitude.

Mr. Craig has been released by the Imperial Ministry of Munitions, and, at an early date, will take up the collection and correlation of data respecting the extent, location and character of the forest resources of Ontario. The co-operation of the Provincial Government has been assured, as has that of a number of private agencies which possess valuable data as to specific portions of the province.

Forest Research

Petawawa Investigation

A greater amount of forest research has been done in Canada during the past year than ever before. In addition to the projects of the Commission of Conservation, the Dominion Forestry Branch has continued its forest survey on the Petawawa military reservation, Ontario, preliminary to studies of growth and reproduction. The Quebec Forest Service has also done work along these lines. The New Brunswick Forest Service has paid very considerable attention to growth and reproduction studies, partly in collaboration with this Commission, and it is expected that the scale of such work will be materially increased during the coming season.

*It s reported that fires in the spring and summer of 1919 have done much damage in Northern Saskatchewan and in the Rocky Mountains.

Surveys by Commission of Conservation

Our own projects, in direct co-operation with the Laurentide and Riordon Companies, and with the Dominion Entomological Branch, have been continued under the direction of Dr. C. D. Howe. This involves a careful study of the reproduction and growth of the pulpwood species, after logging, in the St. Maurice valley, Quebec. The object of this study is wholly practical, since it has for its aim the determination of what modifications of existing methods of cutting are necessary to secure adequate reproduction and growth of the more valuable species.

The studies thus far made have shown that present methods of cutting in the mixed forests of eastern Canada are destructive, rather than constructive, and that there is nothing like adequate provision for the future. The constant tendency is to increase the predominance of the less valuable hardwood species, through the cutting of the conifers only. These observations are borne out, not only by Dr. Howe's studies, but also by a careful investigation, made during the past summer, by Prof. B. A. Chandler, of the Forestry Department of Cornell University, Ithaca, N.Y., in Ne-ha-sa-ne park, in the Adirondack mountains, where conditions are very similar to those obtaining in the St. Maurice valley of Quebec. The lands studied by Prof. Chandler were cut for spruce twenty years ago. The report shows clearly that, because of the overpowering domination of the hardwoods over the free spruce, the prospects for future cuts of spruce seem to be very poor. In other words, it will not take very many cuts of spruce on the diameter limit basis to eliminate spruce as a commercial species from these areas of mixed forest. The full solution of the problem can come only when it is commercially feasible to log the hardwoods as well as the conifers. High transportation costs, however, prevent the utilization of the great bulk of the relatively less valuable hardwoods. Limited markets for the lower grades are also a serious obstacle. The wider use of motor tractors for winter log-hauling may help toward the solution of the transportation problem, within certain limitations of distance, where stream driving is not feasible, and the use of hardwoods in admixture with spruce and balsam groundwood pulp in the manufacture of newsprint, may solve the market problem. Some experiments are under way along these lines.

Cutting of Hardwoods

In line with other recommendations for similar conditions, Prof. Chandler suggests that, in addition to cutting as much of the hardwoods as the market conditions will permit, the removal include, to the lowest possible

size, the diseased spruce, spruce which will not be freed by the cutting, and spruce which have been so badly suppressed that they probably will not recover. As many small and medium, well-topped free spruce should be left as lumbering conditions and the danger from windfall will allow. In other words, as Prof. Chandler says, the timber should be marked by a man who knows all that is known about the silviculture of this type of forest, and, at the same time, knows the market in which he is contending.

It is of the greatest importance that the research projects, upon which Dr. Howe has been engaged, in the forest, be continued and extended, with a view to learning actual conditions and finding out what can be done towards improving them, in connection with logging operations. The effect of forest fires upon natural reproduction, particularly that due to seed stored in the forest floor, will be carefully studied. The prospective value of this work has been definitely recognized by formal resolution of the Woodlands Section of the Pulp and Paper Association, as well as by the fact that two of the best known pulp and paper companies of Canada are contributing financially toward the support of the work on their limits. Should the requisite funds be available, it is hoped that similar investigations may be started elsewhere, notably in Ontario, preferably including an area of primarily coniferous forest, as contrasted with the mixed stands in which we have been working. Such studies would constitute an admirable basis for comparison with the results of investigations in the St. Maurice valley. The prospects for co-operation, on this basis, with the Abitibi Power and Pulp Co. are excellent.*

Licensing and Diameter Limit Systems

The diameter limit system of regulating cutting operations, upon which the hopes for a future crop have so generally been based, did not, in Canada, originate as a measure of scientific forestry, but was first inaugurated to ensure some timber being left on the land for the use of the settler who, it was expected, would follow the lumberman. This is parallel to the genesis of the licensing system of disposing of timber, which recognized the fact that lumbering operations on a given area, at that time the fertile valleys, would be but temporary, and that the soil itself must be retained for the use of the settlers who would follow later.

Both the licensing and diameter limit systems have served a tremendously valuable purpose in Canada; the former, because it has retained under public ownership and control so large a proportion of the non-agricultural lands of the country, and the latter, because it has prevented the complete destruction of the forest, as a forest,

*Since the above was written, co-operation with the Abitibi Co. has been arranged.

over great areas, pending the arrival of methods of regulating cutting operations that should take more fully into account the widely varying conditions that always exist in the forest. It is now fairly generally conceded that improvements in the existing situation are urgently needed, and it is to help in finding the answer to the problem that the Commission of Conservation has embarked upon this plan of forest research. Adequate financial support is, however, imperative, if the work is to go forward on an effective scale, together with investigations of the forest resources of the several provinces, such as have already been made in British Columbia and Saskatchewan.

RECOMMENDATIONS OF COMMITTEE ON FORESTS

1. In Nova Scotia, the Provincial Government is alive to the desirability of appointing a Provincial Forester, to have charge of forest fire protection, to carry on an educational campaign along forestry lines, and to act as provincial fire inspector for the Dominion Railway Commission. The financial difficulties are obvious, since the Crown land revenue is exceedingly limited. It is suggested that the co-operation of the Agricultural College at Truro might be enlisted in consideration of forestry lectures before the agricultural students, thus helping to meet the salary of the Provincial Forester. Further, it is believed that a thorough re-organization of the fire-ranging system, under a Provincial Forester, would improve the efficiency of forest fire protection, to a degree which would readily secure the support of a majority of the timber owners, for a slight increase in the fire tax. If this could be done, the problem would be solved.

2. Legislation is under consideration in Quebec to enforce the adequate patrol of licensed timber berths within Association boundaries, the holders of which are not Association members. The enactment of such legislation is necessary.

3. The extension of the merit system of appointment to the Ontario Forestry Branch is highly desirable, following the precedent already set by British Columbia, New Brunswick, and the Dominion Forestry Branch. From the view point of perpetuating the forests of the province through wise use, the one step now most imperatively required is the transfer to the Provincial Forestry Branch of supervision over cutting operations on all Crown lands. Technical forest organizations are now in full charge of cutting operations on Crown lands in British Columbia, Quebec, and New Brunswick, and in the Dominion Forest reserves, exclusive of licensed lands. Leaving technical work of this kind in non-technical hands means simply that the forests are administered for immediate revenue only, and the question of providing for a future crop does not, and in the very nature of the case, cannot receive anything like adequate attention, if any at all. It is unthinkable that Ontario should much longer lag behind other provinces in a matter which so vitally affects the future interests of the people as a whole.

4. The Dominion Forestry Branch, a technical organization, still has no administrative control over cutting operations on licensed timber berths on Dominion Crown lands, although these berths comprise the great bulk of the merchantable timber in Dominion ownership. This backward situation is parallel to that which exists in Ontario, as contrasted with technical control of such cutting operations in British Columbia, Quebec, and New Brunswick, and also in Dominion Forest Reserves aside from licensed lands. This unprogressive administrative anomaly is a relic of former times, when the necessity for technical handling of technical subjects was less appreciated then now.

5. A revision of the Prairie Fires Ordinance of Alberta* is imperative in the interest of forest protection. The adoption of the permit system of regulating settlers' clearing fires is an essential feature of such revision. Legislation is also required to provide means for compelling provincially-chartered railways in Alberta to provide for the prevention and control of railway fires, through requirements similar to those imposed by the Dominion Railway Commission upon lines under its jurisdiction.

6. Authorities believe that among the peace-time uses of aircraft will be aerial fire patrol and aerial photography; the latter is believed to have possibilities in connection with surveying, the mapping of forest types, etc. It is reported that the Dominion Government has under consideration the establishment of a National Air Service, to investigate and facilitate peace-time uses of aircraft, along these and other lines which would constitute distinctively public services. It is recommended that the possibilities in these directions be thoroughly investigated by the Dominion Government.

7. The Government is definitely pledged to the placing, at the forthcoming session of Parliament, of the lines formerly known as the Canadian Government railways under the jurisdiction of the Railway Commission. In the interest of forest fire protection along these lines, such action is urgently needed.†

8. The Dominion Government should be urged to require wood fuel to be sold only by the standard cord of 128 cubic feet, or fraction thereof, rather than by the load. The latter practice militates strongly against the more general use of wood fuel, besides constituting an injustice to the consumer.

9. The appropriations of the past year, by the Dominion Government and the Governments of Ontario and Quebec, for the location, investigation, and eradication of the white pine blister rust, should by all means be continued. The protection of our forest resources urgently demands the appointment of a forest pathologist, with adequate facilities, in the Department of Agriculture, to study the fungous and other diseases of forest trees, in co-operation with the Chief of the Division of Forest Insects of the Entomological Branch.

10. A good start toward commercial forest planting has been made in the province of Quebec, by some of the pulp and paper concerns, notably the Laurentide and Riordon companies. The

*See footnote, p. 28. †See footnote, p. 30.

Governments of Quebec and Ontario have under consideration the adoption of a planting policy on denuded Crown lands. It is to be hoped that such a policy may be made effective. Quebec has also under consideration the basis upon which limit-holders might acquire limited areas of denuded Crown lands for reforestation purposes. This is a matter of great importance, which should receive attention in Ontario as well.

11. The problem of slash disposal on logging operations is receiving renewed attention, and it is anticipated that experiments as to its practicability and cost will be made, during the coming year, by a number of operators in eastern Canada. From the viewpoint of reducing the heavy losses due to forest insects and fungi, the argument for slash disposal is even stronger than from that of fire protection, although the latter consideration alone has, in many cases on this continent, been considered sufficient to justify compulsory slash disposal on public lands.

12. It is recommended that not less than $16,000 be set aside from the funds of the Commission for the continuation and extension of field work in forestry during the coming year. This should include the beginning of an investigation of the forest resources of Ontario, in co-operation with the Provincial Government, and the extension of the valuable investigation work, under the immediate direction of Dr. C. D. Howe, of the reproduction and growth of pulpwood species in eastern Canada, in co-operation with representative pulp and paper companies, and in collaboration with the several provincial forest services. It is of interest to note that both the Canadian Pulp and Paper Association and the Canadian Lumbermen's Association have, by formal resolution, endorsed the forest research work of the Commission, as well as the investigation, by the Commission, of forest resources of the various provinces, and have urged that funds be made available for the adequate prosecution of these projects.

On motion of Mr.C. A. McCool, seconded by Dr. Howard Murray, the report and recommendations of the Committee on Forests was received and approved.

Quebec Forest Regeneration Survey

BY

C. D. Howe, Ph.D.

Faculty of Forestry, University of Toronto

THE forest regeneration survey in Quebec, begun on the limits of the Laurentide Company in the summer of 1917, under the direction of the Commission of Conservation, was considerably extended in the summer of 1918. Two parties were in the field, and a much larger area was covered. One of the parties continued the work on the limits of the Laurentide Company and the other worked on the limits of the Riordon Pulp and Paper Company.

Plan of Survey

The survey was conducted like an ordinary timber cruise, except that the seedlings were counted on plots $16\frac{1}{2}$ feet (one rod) square at frequent intervals and all the balsam and spruce trees 0·6 inch and over in diameter at breast height were calipered. A five per cent cruise of 2,600 acres was made on the Riordon Company limits and a 10 per cent cruise of 800 acres on the Laurentide Company limits, or of 3,400 acres in all. Thus, the amount of young growth on five square miles of cut-over pulpwood lands may be estimated with considerable accuracy.

During the summer, growth-studies were made upon some 400 balsam and spruce trees. In addition, the age, diameter and height of more than 20,000 seedlings were determined. As yet, not enough growth-studies have been made, especially of the larger-sized trees, to predict the rate of growth and the future yield of the balsam and spruce on the cut-over lands. The studies of the past summer, however, corroborate the results of the previous summer, namely, that the young balsam and spruce under the cover of the hardwoods grow very slowly. For example, the average 4-inch balsam was found to be 55 years old, the average 8-inch tree 70 years old, and it was 80 years old at 10 inches in diameter, breast high. This statement is based on the growth analyses of about 300 trees. The spruce grows even more slowly. At 4 inches in diameter breast high the average tree was found to be 80 years old; at 8 inches in diameter, 120 years old and at 12 inches in diameter, 165 years old. This statement is based on growth-studies of 100 trees. The species is not the slow-growing black spruce of the swamps, but the red spruce of the well-drained upland soils as it is found associated with the hardwoods.



The Past and the Future. The giant pine tree, four feet in diameter, is replaced by a paper birch, a spruce and two balsams. These trees, however, have not made their whole growth since the pine tree was cut thirty years ago. They had been growing in a suppressed condition beneath the pine and were released when the tree was removed. No white pine seedlings or saplings could be found in the vicinity of the stump.

This represents a very general condition in the mixed forest type. Areas that had from ten to twenty such pine trees to the acre now contain no young pine to replace those removed by lumbering operations. The white pine is gone from the forest on such areas and it probably will never return in its former quantities unless planted. Lac Octagonal, Quebec.

Face p. 164.



This area has been severely culled, about three-fourths of the crown cover having been removed. The removal of the trees greatly stimulates the development of the undergrowth, in this case mountain maple. The conditions represented here explain why white pine is being crowded out of the forest. Its seedlings require light; they cannot live in the dense shrubbery that follows logging operations. They also explain in part why balsam and spruce grow so slowly on cut-over lands. Unlike the pine, their seedlings can endure heavy shade, but they simply exist under conditions like the above; they do not really grow until the shade is at least partially removed.

How long after logging operations the luxuriant undergrowth persists is not definitely known, but it probably exists from ten to thirty years, depending upon its nature and the extent of the crown cover removal.

How to overcome the retarding influence of the woody undergrowth upon the regeneration of the commercial species is one of the great problems to solve if our forest areas are to remain continuously productive.

Slow Growth of Spruce

It will be seen from the above that it takes about 40 years for a spruce tree to pass from the 4-inch to the 8-inch diameter class, and about the same number of years for an 8-inch tree to become a 12-inch tree, the minimum diameter limit at which a spruce may be cut in Quebec.

In order to make the situation as advantageous for the spruce as possible, and to make allowances for possible modifications when a greater number of the large-sized trees are studied, it is assumed in the following discussions that the last of the 8-inch to 11-inch class will reach the 12-inch class in 30 years.

Riordon Company Limits

The studies on the Riordon Company limits were conducted in the Boulé River valley and in the Macaza River valley, the waters of both of which eventually reach the river Rouge. The company has classified the forest cover into four general types, a pure hardwood type, a pure conifer type, and two intergrading types, one in which the hardwoods predominate and the other in which the conifers predominate in the mixture. They are designated, respectively, as the hardwood type, conifer type, hardwood-conifer type, and the conifer-hardwood type. Topographically, each may be subdivided into flat, lower slope and upper slope. This classification was followed in recording and tabulating our results. In the Boulé district one-third of the area examined belonged to the coniferous-hardwood flat and one-fifth to the hardwood-coniferous flat, while in the Macaza region about one-third of the area investigated fell into the hardwood-coniferous lower slope and about one-sixth into the coniferous-hardwood lower slope type.

Boulé River Valley

The Boulé River area examined was culled lightly for large diameter spruce about 30 years ago. A more general cutting took place about 20 years ago. Ten years ago the third cutting of the area began, and has continued to the present time. Three-fourths of the area examined has been cut over three times, in addition to the original white pine cutting, which took place about 40 years ago. The cuttings of 30 and 20 years ago took only spruce, but, since ten years ago, the balsam is being taken in increasingly large proportions.

It is very difficult, in a mixed forest in which the softwoods are removed, to classify the cuttings as light or severe, according to the degree of opening up the crown cover, so an arbitrary standard has been adopted. When less than ten trees per acre have been removed, the area is considered lightly culled; 10 to 30 trees, moderately culled, and when more than 30 trees are taken from an acre, the cutting is classed as severe. On this basis 3 per cent of the area examined in the

Boulé valley was virgin, 12 per cent lightly culled, 42 per cent moderately and 43 per cent severely culled.

The strips, four rods wide, on which the young growth was measured in the Boulé valley totalled slightly more than 8 miles in length—65 acres—or, in other words, a 5 per cent cruise of 1,300 acres.

Young Growth on Logged-over Areas

The tables below exhibit the present number of young trees on the logged-over areas, according to the forest type and to the degree of culling. Only the trees 4 inches in diameter and above are included here, since they represent the trees that will be cut in the next two logging operations on these areas. The spruce trees 8 inches and upwards in diameter will furnish the next crop. Since, as stated above, it requires at least 30 years for an 8-inch tree to attain the legal diameter limit, the number of trees 12 inches and more in diameter that will be on the area at the end of the 30-year period is stated in the brief discussion following the tables. The spruce trees in the 4-inch to 7-inch class will furnish the logs for the succeeding crop, which will not be harvested in the present century if they grow at the same rate at which their predecessors have grown.

Preponderance of Balsam

It will be noted that, in nearly all cases, the small balsam occurs in greater numbers than the spruce, but at present no safe prediction can be made as to the number of trees that may remain after a period of 30 years because of the balsam's great susceptibility to disease.

The decrease in numbers in passing from the 4-inch to 7-inch class to the 8-inch to 11-inch class is not quite normal, for the latter class has been reduced in numbers by cutting below the legal diameter limit in case of the spruce. However, this will make little or no difference in the prediction of the future crop if the practice of cutting below the diameter limit continues at that time.

To include the trees of the 12-inch to 15-inch class which remain after the logging operations may give a more favourable aspect to the situation than really exists. While a few were accidentally left, most of them were left because they were isolated or in places too difficult of access to render them merchantable.

CONIFER-HARDWOOD FLAT

(MODERATELY CULLED. BASED ON 6·8 ACRES.)

Trees removed—15 balsam and 12 spruce per acre.

Present number of trees per acre—

4– 7	in. inclusive,	diameter	breast	height	.....	34·6	balsam	26·4	spruce
8–11	"	"	"	"	.....	13·1	"	6·6	"
12–15	"	"	"	"	.....	0·5	"	0·3	"
				Total	.....	48·2	"	33·3	"

Based on the number of trees, moderate culling in this type took only one-fourth of the balsam and spruce. Yet, while 12 spruce trees have been taken away, the next crop 30 years from now will yield only 7 trees per acre.

Conifer-Hardwood Flat

(Lightly Culled. Based on 3·5 acres.)

Trees removed—2 balsam, 6 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height	26·0	balsam	16·1	spruce
8–11 " " " "	11·6	"	3·7	"
12–15 " " " "	1·4	"	0·5	"
Total	39·0	"	20·3	"

More trees remain here than were taken away, and yet, on our assumption that it will take 30 years for an 8-inch tree to become a 12-inch tree, there will be only 4 merchantable spruce trees per acre at the end of that time. It is evident that this area was lightly culled, because it did not bear as much spruce and balsam as the adjacent areas.

Conifer-Hardwood Flat

(Severely Culled. Based on 10·1 acres.)

Trees removed—32 balsam, 25 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height	21·8	balsam	22·1	spruce
8–11 " " " "	4·1	"	4·5	"
12–15 " " " "	0·4	"	0·3	"
Total	26·3	"	26·9	"

Severe culling here took one-half the stand, and the remaining trees are remarkably evenly distributed between the spruce and balsam. Approximately five trees of each per acre will be in the commercial class 30 years hence.

Hardwood-Conifer Flat

(Moderately Culled. Based on 8·4 acres.)

Trees removed—8 balsam, 12 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height	27·5	balsam	16·6	spruce
8–11 " " " "	7·0	"	7·4	"
12–15 " " " "	0·6	"	0·4	"
Total	35·1	"	24·4	"

Approximately one-fifth the balsam and one-third the spruce stand were removed by moderate culling in this type. It will be a long time, however, before all the trees of the remaining four-fifths and two-thirds, respectively, become saw-logs. The prospect at the end of 30 years is approximately 8 trees each of spruce and balsam.

Hardwood-Conifer Flat

(Severely Culled. Based on 3·4 acres.)

Trees removed—28 balsam, 21 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height	26·5	balsam	21·0	spruce
8–11 " " " "	2·3	"	2·8	"
12–15 " " " "				
Total	28·8	"	23·8	"

Logging operations here took one-half of the balsam and spruce trees ranging from 4 to 20 inches in diameter. The remaining one-half are very small. After 30 years, if they are not wind-thrown, 2 balsam and 3 spruce of commercial size will remain on the average acre.

Conifer-Hardwood Lower Slope

(Moderately Culled. Based on 3·4 acres.)

Trees removed—10 balsam, 18 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	35·6	balsam	27·0 spruce
8–11 " " " "	12·2	"	6·5 "
12–15 " " " "	1·4	"	1·4 "
Total.....	49·2	"	34·9 "

Seventeen per cent of the balsam and 33 per cent of the spruce stand were removed by the logging of this type. The cut of balsam in 30 years will be a little heavier than the last, but the spruce cut will be only one-half as large as the last from the standpoint of the number of trees on the average acre.

Conifer-Hardwood Lower Slope

(Severely Culled. Based on 2·1 acres.)

Trees removed—20 balsam, 26 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	24·6	balsam	23·7 spruce
8–11 " " " "	11·3	"	6·5 "
12–15 " " " "	0·9	"	0·4 "
Total.....	36·8	"	30·6 "

Severe culling took 35 per cent of the balsam and 46 per cent of the spruce from this stand. The cut after 30 years will be smaller in number of trees removed. That of spruce will be less than one-third the last cut.

Hardwood-Conifer Lower Slope

(Moderately Culled. Based on 2·5 acres.)

Trees removed—10 balsam, 14 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	18·0	balsam	36·0 spruce
8–11 " " " "	8·8	"	19·2 "
12–15 " " " "	0·8	"	1·2 "
Total.....	27·6	"	56·4 "

This is the only type within the Boulé district where the prospect is good for another cut in 30 years.

Hardwood-Conifer Lower Slope

(Severely Culled. Based on 2·5 acres.)

Trees removed—15 balsam, 24 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	31·7	balsam	21·7 spruce
8–11 " " " "	13·4	"	7·7 "
12–15 " " " "	0·4	"	0·4 "
Total.....	45·5	"	29·8 "

The capital stock of commercial species was reduced 44 per cent in the case of the spruce and 25 per cent in the case of the balsam. If the next crop matures in 30 years, about the same number of balsam will be taken, but only one-third as many spruce as were removed at the last cutting.



A spruce tree was cut here sixteen years ago and the little balsams came up in the opening thus made. Later some small trees were wind-thrown, giving the balsams a better chance, which they improved. Note the rapid height growth. These trees are from four to six feet in height. Trees of the same age may be found under the shade of the forest in the background but they are only six to twelve inches high. Balsam demands light for rapid growth.



Old decrepit yellow birches with an understory of spruce and balsam. The spruce tree at the left is overtopped by the birch and, although it receives plenty of side light, it is growing very slowly. The balsams between the two birches were released by the removal of a large spruce sixteen years ago. They are about thirty years old and probably were established as the result of opening of the crown cover by white pine logging operations at that time. The small balsams in the foreground came in after the large spruce was removed, but were shaded by a larger balsam tree, the top of whose stump is seen in the lower left hand corner. This tree was cut ten years ago and the little trees responded to the removal of shading only after seven or eight years, as is shown by their elongated internodes. Lake Edward, Quebec.

Face p 168

The district in the Macaza valley where the survey was made had been cut for pine 25 to 30 years ago. About 20 years ago it was lumbered for the large spruce. It was cut over again for spruce and the larger balsam about 10 years ago. In 1914, the fourth lumbering operation on the area began and is still continuing.

Six and seven-tenths per cent of the Macaza area was found to be virgin, 11 per cent lightly culled, 31 per cent moderately culled, and 49 per cent severely culled. Two and three-tenths per cent of the area was windthrown.

The small trees were actually counted on 67 acres, or the equivalent of a 5 per cent survey of 1,340 acres.

The following tables present the condition of the young growth after the various logging operations:

HARDWOOD-CONIFER LOWER SLOPE

(LIGHTLY CULLED. BASED ON 1·6 ACRES)

Trees removed—3 balsam, 6 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	17·4	balsam	8·4	spruce
8–11 " " " "	8·1	"	8·0	"
12–15 " " " "	0·6	"	2·4	"
Total.....	26·1	"	18·8	"

If one considers only the trees now 8 inches in diameter and above as likely to be of commercial size within 30 years, then both the spruce and balsam will maintain themselves on lightly-culled areas like the above.

HARDWOOD-CONIFER LOWER SLOPE

(MODERATELY CULLED. BASED ON 10·3 ACRES)

Trees removed—6 balsam, 13 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	22·0	balsam	14·0	spruce
8–11 " " " "	8·0	"	8·4	"
12–15 " " " "	0·7	"	0·7	"
Total.....	30·7	"	23·1	"

Moderately culling on areas like those represented here removes only 16 per cent of the balsam and 36 per cent of the spruce, and it leaves enough young growth to replenish the supply.

HARDWOOD-CONIFER LOWER SLOPE

(SEVERELY CULLED. BASED ON 5·6 ACRES)

Trees removed—12 balsam, 26 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	14·0	balsam	15·5	spruce
8–11 " " " "	5·0	"	9·9	"
12–15 " " " "	0·2	"	0·5	"
Total.....	19·2	"	25·9	"

Logging operations on areas of which the above is representative reduce the balsam and spruce stands above 4 inches in diameter by 36 per cent and 50 per cent, respectively. The same number of spruce trees remain as were taken away, but less than half that number will be of commercial size within the next 30 years.

Conifer-Hardwood Lower Slope

(Lightly Culled. Based on 1·4 acres)

Trees removed—3 balsam, 3 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					53·5	balsam	32·9	spruce
8–11	"	"	"	"	24·2	"	12·8	"
12–15	"	"	"	"	2·1	"	2·7	"
Total					79·8	"	48·4	"

Only 6 trees per acre were removed by the light culling, in comparison with the 30 or more trees per acre in the severe cullings. More trees 8 inches and above remain for the next crop than were cut in the original operation.

Conifer-Hardwood Lower Slope

(Severely Culled. Based on 6·4 acres)

Trees removed—10 balsam, 29 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					33·1	balsam	22·9	spruce
8–11	"	"	"	"	3·3	"	9·7	"
12–15	"	"	"	"	0·4	"	1·7	"
Total					36·8	"	34·3	"

The severe cutting here took 42 per cent of the spruce and 22 per cent of the balsam. While the young growth remaining is plentiful and remarkably evenly distributed between the spruce and balsam, most of the trees belong to the smaller diameter class. The number of spruce trees in the next harvest will be less than half that of the last cutting.

Conifer Flat

(Severely Culled. Based on 8·3 acres)

Trees removed—10 balsam, 43 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					12·8	balsam	40·0	spruce
8–11	"	"	"	"	1·3	"	10·0	"
12–15	"	"	"	"	....		0·3	"
Total					14·1	"	50·3	"

The stand of balsam and spruce was reduced by 40 per cent each. The trees from 4 inches in diameter upward will in time replace the trees removed, but at the end of the 30-year period there will be only one balsam and 10 spruce trees on the average acre, that is, one-fourth as many spruce trees as were removed by the last cutting.

Conifer-Hardwood Flat

(Severely Culled. Based on 4·2 acres)

Trees removed—17 balsam, 39 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					12·6	balsam	30·0	spruce
8–11	"	"	"	"	2·5	"	11·9	"
12–15	"	"	"	"			0·2	"
Total					15·1	"	42·1	"

One-half the stand was taken by the severe culling. Here, again, from a biological standpoint, both the balsam and spruce will maintain their numbers in the forest, if undisturbed for the next 75 to 100 years, but, from a commercial standpoint, that is too long to wait. Forty-two spruce trees have been removed on the average acre. After 30 years there will be 12 saw-log trees to take their place.

HARDWOOD-CONIFER FLAT

(MODERATELY CULLED. BASED ON 2·5 ACRES)

Trees removed—7 balsam, 14 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					12·8	balsam	14·0	spruce
8–11	"	"	"	"	2·8	"	4·0	"
12–15	"	"	"	"				
Total					15·6	"	18·0	"

Areas like this will probably never be lumbered again for conifers.

HARDWOOD-CONIFER FLAT

(SEVERELY CULLED. BASED ON 1·4 ACRES)

Trees removed—7 balsam, 34 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					12·8	balsam	15·0	spruce
8–11	"	"	"	"	3·9	"	0·7	"
12–15	"	"	"	"	0·7	"	0·7	"
Total					17·4	"	16·4	"

The outlook for the regeneration of spruce is decidedly poor on this area. It probably never will produce as many trees as were removed by the last cutting.

The regeneration studies on the Laurentide Company's limits were made on the rivière Croche, near Kennedy creek, much farther north and in a different type than the investigation on the same company's limits in the summer of 1917. Most of the area studied belonged to the white birch-balsam type. There are evidences of logging about 35 and 25 years ago. During the past 10 years it has been cut over again with increasingly close utilization. The area was found to be 27 per cent virgin, 4·5 per cent lightly culled, 13·5 per cent moderately culled, and 53 per cent severely culled. One and four-tenths per cent of the area was windfall.

The sum of the sample strips was 74 acres, the equivalent of a 10 per cent cruise of 740 acres.

The tables given below are representative of the present distribution of the diameter classes of the remaining balsam and spruce:

WHITE BIRCH-BALSAM SLOPE

(MODERATELY CULLED. BASED ON 5·8 ACRES)

Trees removed—19 balsam, 10 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height					76·0	balsam	4·8	spruce
8–11	"	"	"	"	10·4	"	3·6	"
12–15	"	"	"	"	....		0·3	"
Total					86·4	"	8·7	"

The stand of balsam has been reduced 18 per cent and the spruce 54 per cent by the logging operations. Thirty years from now the area will yield 3·9 spruce trees of merchantable size per acre.

White Birch-Balsam Slope

(Severely Culled. Based on 14·5 acres)

Trees removed—60 balsam, 74 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	41·3 balsam	3·2 spruce
8–11 " " " "	6·7 "	1·2 "
12–15 " " " "	....	0·2 "
Total.....	48·0 "	4·6 "

The number of balsam trees has been reduced to the extent of 56 per cent and the spruce 76 per cent. Thirty years from now there will be 1·4 spruce trees per acre having a diameter of 12 inches and upward.

Yellow Birch-Balsam Slope

(Moderately Culled. Based on 2·7 acres)

Trees removed—17 balsam, 7 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	46·0 balsam	7·3 spruce
8–11 " " " "	25·0 "	3·5 "
12–15 " " " "	1·7 "	0·3 "
Total.....	72·7 "	11·1 "

The balsam is apparently increasing and the spruce barely holding its own in the forest. The area is already well stocked with commercial balsam.

Yellow Birch-Balsam Slope

(Severely Culled. Based on 15·3 acres)

Trees removed—59 balsam, 14 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	33·0 balsam	5·5 spruce
8–11 " " " "	5·0 "	1·5 "
12–15 " " " "	0·3 "	0·2 "
Total.....	38·3 "	7·2 "

In terms of the number of trees per acre the capital stock has been reduced 43 per cent for the balsam and 50 per cent for the spruce. In 30 years there will be 2 spruce and 5 balsam trees on the average acre.

Balsam-Spruce Flat

(Severely Culled. Based on 7·6 acres)

Trees removed—45 balsam, 25 spruce per acre.

Present number of trees per acre—

4– 7 in. inclusive, diameter breast height.....	32·0 balsam	10·2 spruce
8–11 " " " "	5·8 "	3·6 "
12–15 " " " "	0·1 "	0·5 "
Total.....	37·9 "	14·3 "

Logging operations in this type have taken more than one-half the stand, in terms of both balsam and spruce. If the next operation comes 30 years from now, it could take 4 spruce of commercial size per acre.

Sample Plots Established

In addition to the regeneration survey, the chief results of which have been indicated above, a party spent nearly three months in establishing permanent sample plots: one on the Riordon Company's limits at Octagonal lake and two on the Laurentide Company's limits at lake Edward. Each plot contained an acre. They were carefully surveyed, then each balsam and spruce tree above 1-inch diameter breast height was calipered, numbered with white paint and its position in the plot mapped. Each plot contains patches representing lightly, moderately and severely culled areas. On these plots, subsidiary plots, containing from one to four square rods, were laid off and the seedlings counted, measured and tagged with numbers. Similar plots were established under different degrees of shading by underbrush, such as the mountain maple. Other plots were made to determine the influence of slash upon the reproduction of spruce and balsam. The brush was piled and burned. On one half of this plot the seedlings already present were removed; on the other half they were allowed to remain. On another area the brush was lopped and not burned. The seedlings were treated as in the burned plot. On the control plots the slash was undisturbed.

Diseased Trees

A careful census of the diseased trees on each of the permanent sample plots was made by Mr. J. M. Swaine, of the Entomological Branch. He also worked out some stages in the life history of balsam-destroying and of white birch-destroying beetles. We are very fortunate, indeed, in having the co-operation of the Entomological Branch in the sample-plot work. The importance of these investigations and the advisability of similar work by a trained mycologist are emphasized below.

It is believed that, only by experimentation and the definite measurement and recording of conditions and results, can we determine the factors influencing or controlling the reproduction and growth of spruce and balsam. Many other experiments suggest themselves, especially with reference to condition of the seed bed in relation to the abundance of germination and establishment of the seedlings, with reference to the length of time seeds may remain buried in the duff and still retain the germinating capacity, with reference to the relationship between the abundance of seedlings and the distance from the seed tree. It is urged that a party may be kept continuously upon sample plot work.

Scarcity of Spruce makes Logging Unprofitable

It is evident from a study of the tables given above that the spruce in the 8-inch to 11-inch diameter class does not occur in sufficient numbers on the average acre to make logging profitable for the operator. Whether or not this

deficiency could be rectified by a stricter compliance with the law in regard to the minimum diameter limit is capable of demonstration by continuing and extending the growth-studies already begun.

With the exception of the white birch-balsam type, it is also evident from a study of the tables that, including the 4-inch to 7-inch diameter class, there are about as many spruce trees now on the average acre as have been removed by the logging operations. The growth-studies, however, so far as they have been made, indicate that the trees of the smaller diameter classes grow so slowly that they cannot be depended upon to reach commercial size during a period within which the lumberman can afford to hold his limits. This would be the crucial point, the deciding factor, in the future disposition and management of the cut-over pulpwood lands, and, if a fact, it should be demonstrated by a weight of evidence sufficient to put the point beyond controversy. This is possible through growth-studies on a sufficient number of trees in each diameter class.

The presence of a large number of small spruce trees in the mixed forest type, coupled with the fact that a very small percentage of them ever attain saw-log size, leads one to ask: Can anything be done to help them along, to hasten their growth and to bring a larger number into the merchantable class? This is also capable of demonstration through the agency of sample plots. Such plots for intensive study as described above have already been established, but they should be supplemented by plots for more extensive study, such as, for example, numerous small plots to determine the rate of growth of the young trees under the different degrees of opening up of the crown cover by lumbering operations. Particularly to be desired are plots from which the hardwoods have been removed. These can be found and are only waiting for establishment.

Future Yield of Balsam

As has already been indicated, no prediction can be made about the future yield of balsam until it is known what percentage of the normal stand dies or is made unfit, commercially, through disease, both insect and fungous. Hereafter, the regeneration survey should include a balsam-disease survey. When the calipering is being done, the noticeably diseased trees could be indicated with comparatively little cost of time. The study of the insect diseases of the balsam on the permanent sample plots is being conducted by a well-known and highly-trained expert. A knowledge of the various fungous diseases of balsam is doubtless of as much importance commercially and they work more insidiously. They should be studied by a man of calibre and attainments similar to those of the specialist in the insect diseases of trees. A thorough

knowledge of the various diseases of the balsam and of methods of checking them is the most urgent problem in the whole situation on the cut-over pulpwood lands, for were it not for the great disease mortality of this species there would be no occasion to worry over the future pulpwood supply in Quebec.

How Shall we Make our Forests Safe for Trees?

BY

C. D. Howe, Ph.D.

Faculty of Forestry, University of Toronto

WE are proud of the part Canada has taken in making the world safe for democracy, but, however idealistic we may be in regard to the nature of our relationships with our fellowmen, we must ever bear in mind that the attainment of a safe democracy depends upon the fulfilment of certain *economic* conditions. Absolutely essential is the sustainment of the fundamental industries, that is, those that draw their wealth primarily from the soil—agriculture, mining and lumbering. When the farm, the mine and the forest begin to fail in production or distribution, there will be trouble ahead for any democracy, no matter on however high a plane it may have been conceived and executed.

I wish to call your attention to the forest, and to do so by asking: Have we treated our forests in such a manner that we can look forward to their continued productivity? The lumber industry created for Canada, in 1917, forest products valued at $116,000,000. Industries wholly or partially dependent upon wood in some form increased our wealth by over $250,000,000. The lumber industry is exceeded only by agriculture and manufacturing as a producer of wealth in this country; it has an invested capital around $150,000,000; it employs over 50,000 people, and distributes nearly $40,000,000 in wages. Have we so handled our forests that this enormous wealth-producing industry can be sustained at its present output?

In addition to the large amounts indicated above, the forests, as is well known, contribute, through stumpage sales, dues and ground rent, a large proportion of the provincial revenues in British Columbia and Eastern Canada. For example, in the past ten years Ontario has received $16,000,000 and Quebec $14,000,000 from this source. Have these provinces managed their forests so they can confidently look forward to the continuous flowing of these streams of sylvan revenue?

Man-made Forest Conditions

Let me outline for you some of the man-made forest conditions which give rise to these questionings. Notwithstanding the enormous revenues derived from them, the owners of the forests have allowed them recklessly

to be destroyed by fire. If we take all the land in Canada incapable of development for agriculture, fit only for growing trees, fully one-half has been run over by fire and the majority of the trees killed or injured. Thus, it is clear, the forest has been a very unsafe place for trees. Really the only safe places have been the gardens, the highway borders, farm woodlots surrounded by cultivated fields, or otherwise protected from the fire demon. The insecurity of the trees in the forest may be further emphasized by repeating Senator Edwards' statement that over twenty times as many have been killed by fire as have fallen before the lumberman's axe. It is interesting, in this connection, to add, that the forthcoming report of the Commission on the British Columbia forests estimates that twenty-two times as much timber has been destroyed by fire as has been cut in logging operations. In fact, the Commission emphasizes the situation by stating, in effect, that more trees bearing saw-logs have been destroyed in British Columbia by fire than can probably be found today in the whole of Canada. British Columbia is no exception. The eastern provinces, in proportion to their area, have been at least as badly burned.

The financial losses involved in this destruction of standing timber are, of course, enormous. I would like to point out, however, that there is a tendency to exaggerate such losses in the destruction of timber in the hinterlands. Mature timber has no apparent value unless it is within reach of the markets. If an area is burned so far from the market that another generation of trees can come on before lumbering operations get there, then no direct financial loss is involved.

The most destructive effects of forest fires, however, are not generally recognized or appreciated, unfortunately, even by those who have our forests in their keeping. Fires on cut-over lands or on recuperating old burns are the most destructive to future values. In fact, the repeated forest fire is the vicious and destructive agent, for it kills the young trees which are to make the future forest and it kills the mother trees (seed trees), which might, if allowed to live, replace the destroyed young. A few years ago, under the direction of the Commission of Conservation, I made a careful examination of 80,000 acres on cut-over and burned-over pine lands in the central portion of 'old' Ontario. The area was first lumbered 50 years ago, and had been cut over several times since, but no lumbering of any consequence had been done for the past 25 years. About 80 per cent of the area had been burned since the lumbering operations ceased, and about one-quarter of it had been burned seven times. I found

on the areas burned only once, 110 young pine trees on the average acre; on the areas burned twice, only 14 pine trees. You see the second fire reduced the next crop from 110 to 14 trees per acre. The third fire reduced the pine trees to 7 per acre, and, on the areas burned four or more times, there were only 3 pine trees on the average acre. It will take several hundred years for nature to restock these areas with pine.

One-half of Commercial Timber Burned

This is not an exceptional case. Repeated forest fires are producing similar results on thousands of square miles throughout the Dominion. One-half of our commercial timber lands has been burned over. Even if there never were another forest fire, one-half of our future supply of timber should come from these burned areas. Every fire decreases that possibility by destroying the young of commercial trees. We have not only killed the commercial, revenue-bearing trees on one-half the timber producing area in Canada, but our forest policy has been such that we have virtually decreed their children shall not live. Repeated fires kill not only the first-born, but the second-, the third-born, and sometimes even the seventh-born. You cannot kill the children for several generations and look forward to the continuance of the race; you cannot kill the young pines and spruces on an area every 5, 10, or 20 years and expect eventually to get saw-logs.

In addition to fire, disease, due to insects and fungi, makes the forest an unsafe place for trees, especially on cut-over lands. The insidiously effective feature about these diseases is that they all work together with almost calculated design; the attack of one leaves the tree much more susceptible to injury and death by another. For example, the spruce bud-worm, which swept the forests of eastern Canada a few years ago, while it caused the death of large numbers of balsam trees, has been infinitely more destructive because of the secondary epidemics following in its wake. According to Mr. J. M. Swaine, Chief, Division of Forest Insects, of the Entomological Branch, there are at least four such following-up diseases, a beetle and a weevil, a heart rot, and a sap rot; they are killing enormous quantities of balsam in eastern Canada, and some of them are attacking the spruce. No one can safely predict where these epidemics may end. It may be that our treatment of the forests has been such that they are becoming increasingly infected with disease germs and, therefore, increasingly insecure for trees. This may be due to the accumulation of slash and the increased number of injured and weakened trees as the result of logging operations. Slash and dead trees form the breeding ground of some of the worst forest diseases.

Swaine calls them the "garbage of the forest," and as the accumulation of garbage in cities is inimical to human health, so the garbage of the forest is inimical to the health of trees.

Trees on Cut-over Lands

Now let us turn to the cut-over lands which have not been burned since the logging operations. Surely these are safe places for trees because they have escaped destruction by fire. However, let us inquire into the situation, using as a basis the results of an investigation being carried on by the Commission of Conservation on cut-over pulpwood lands in the River Rouge and St. Maurice valleys in Quebec. The original forest in the St. Maurice valley was dominated by white pine, scattering giant trees from 3 to 6 feet in diameter and from 100 to 150 feet high, towering 50 to 75 feet above the associated birch, maple, spruce and balsam. The region was first lumbered for pine between 60 and 70 years ago, and the lumbering was continued down to 35 years ago. Judging from the stumps still left, the number of trees ran from 5 to 30 per acre.

To-day one sees only an odd pine in that region, on bluffs and ridges inaccessible to the logger; and this in a region that has yielded enormous quantities of pine logs. The trees have gone from the forest, and, more important still, they have left no young behind them to take their places. I mean, under the general forest cover. There are scattered young trees along the lake shores, in old logging roads, and in other open places, but in the deep forest I could count all the young pines I saw in two summers' work on the fingers of my two hands, and yet old pine stumps are everywhere. The forest has been treated in such a manner that the white pine has been crowded out. In order to prosper, it demands plenty of overhead light. The openings in the forest made by the removal of the pine filled in with hardwoods; by overshading, the latter stifled the light-needing young pine trees before they could get a real start in life. This region has been a very unsafe place for the second generation of the pine. We do not know yet how general this condition is. We hope to know some time, as our investigations progress, but, if this condition does extend throughout the unburned old pine lands in eastern Canada, the position of the white pine becomes serious. I have already demonstrated what is happening to white pine reproduction on areas repeatedly burned. If we put its position on these two classes of areas together, that is, on the burned and unburned lands, it will be seen that the maintenance of the white pine in our forests is, indeed, at a very critical point.

Commission's Investigations

During the past two summers the Commission's investigators of the condition of affairs on the cut-over lands have actually counted the small spruce and balsam trees on 300 acres. By the strip method, a timber cruise usually covers five per cent of the area. On this basis, our forest regeneration survey, conducted in practically the same manner as a timber cruise, represents a 5 per cent cruise of 6,000 acres, or about nine square miles of cut-over lands. These areas were, as a rule, cut twice in the earlier days of lumbering for spruce saw-logs, since, they have been cut over twice, and some of them three times, for pulpwood. Let us now turn to these cut-over lands and see if they are to remain continuously productive in terms of spruce saw-logs, or, following more closely my theme, to find if, under the present logging methods, the forest is a safe place for spruce trees.

Spruce Reproduction

I shall not detain you with an enumeration of statistics, but trust you will bear with me while I give a brief summary which exhibits representative conditions. We counted the small trees and stumps on 97 acres of severely culled areas, mostly in the mixed forest type.

AREAS SEVERELY CULLED

(Based on sample plots totalling 97 acres)

Spruce trees removed, per acre—26.	
Present number of spruce trees per acre—	
Seedlings (below 0·6 in. diameter at breast height)	422·0
0·6–3 inches diameter at breast height, inclusive	27·9
4– 7 " " " "	19·6
8–11 " " " "	7·4
Total	476·9

It would seem at first glance that the spruce is holding its place in the forest after logging, but let us analyze the figures. Note the high death rate as the trees grow older. Over 90 per cent of the seedlings are dead before they get to be 3 inches in diameter, or in other words, only 28 trees remain, and 30 per cent of the 28 are gone before they reach 7 inches in diameter. The increased rate of mortality (60%) in the 8- to 11-inch group is due to cutting below the diameter limit. *The result in the end will be that only 7 trees will remain to take the place of the 26 per acre removed by the logging operations.* Thus, you see that the cut-over mixed forests, represented by the above summary, are very unsafe places for spruce trees. *There will be less than one-third as many in the future forest as in the virgin forest.*

Balsam Reproduction

We have indicated the status of affairs in regard to the position of white pine and spruce in our forests; now let us consider for a moment that of the balsam, which is becoming each year a more important tree commercially. I would call your attention again to the areas severely culled, by presenting the same 97 acres to demonstrate what they show with regard to the future of balsam.

AREAS SEVERELY CULLED

(Based on sample plots totalling 97 acres)

Balsam trees removed per acre—32.

Present number of balsam trees per acre—

Seedlings (below 0·6 in. in diameter at breast height)	2,477·0
0·6– 3 inches diameter at bresat height, inclusive	59·7
4·0– 7 " " " "	26·7
8·0–11 " " " "	11·7
Total	2,575·1

Over 2,500 balsam trees to the acre—five times as many as there were spruces on the same area! Again, however, we see evidence of a remarkably high death rate, especially among the seedlings. Over 97 per cent of them never reach the 3-inch-diameter class. They die at the rate of over 2,000 per acre. One-half of these 1- to 3-inch trees are dead before they reach the 4- to 7-inch-diameter class, and the death rate is practically the same in passing into the 8- to 11-inch class. *The final result is 12 trees per acre, where 32 trees have been taken away, or, in other words, there will be a little more than a third as many balsam trees in the future forest as were in the virgin forest.* Nor is this the whole story. Our investigations indicate that 7 of those 12 balsams will be so badly diseased by heart-rot as to be unfit for pulpwood, *so the final result will probably be 5 pulpwood-bearing balsam trees where 32 were taken away.* Do you think our severely culled forests are really safe for balsam trees?

Forests cannot Regenerate Themselves

At the beginning of this paper we assumed that the prosperity of our country would be considerably impaired by the crippling of a business that created wealth to the extent of over $400,000,000 a year. To keep the lumber industries up to their present capacity the forests must be kept continuously productive, in terms of commercial trees. I have tried to point out the pernicious effect of repeated forest fires in reducing the possibility of reproduction. I have placed before you the conditions of certain unburned severely-culled areas. In this manner I am trying to drive home the apparent fact that *we are causing our com-*

mercial timber trees to commit race suicide, because, in our treatment of the forests, we are establishing conditions in which they cannot regenerate themselves in their former numbers. The tenure of the commercial trees in the forest is quite insecure. How, then, shall we make the forest safe for trees?

In the first place, let me say that the fundamental problem in the care of our forests has not yet been solved. It ought to be impossible, after 30 years of governmental activity in that direction, for one to urge the necessity of adequate forest fire protection, but it is necessary, and that fact alone is a sad commentary, not only upon the official conception of a government's function, but also upon the public's valuation of its own property.

During the last decade about $10,000,000 has been spent in protection, and yet the forest has been so unsafe for trees, through destruction by fire, that there is apprehension of serious curtailment, perhaps exhaustion, of the timber supply. As a matter of fact, the safety of our forests is still very largely in the hands of Providence. I mean, it depends upon the weather conditions. Things go fairly well in our ordinary seasons of plentiful rainfall, but when the exceptionally dry season comes there is apparently not a government organization sufficiently well developed to cope with the situation. This state of affairs is in nowise a reflection upon the earnest, hard-working men in charge of our fire-fighting organizations. Their efforts, however, fall short of the goal because they are the victims of an inherited political tradition in regard to the methods of handling government business.

Forest Fire Protection

While we acknowledge considerable improvement in government fire protection in the past few years, we must look this situation in the face and confess that it has been a failure from the standpoint of the safety of trees, and acknowledge that it always will be a failure under a system still prevalent over wide areas in Canada in which men are employed, not because they are efficient fire fighters, but for other reasons; under a system in which an employee discharged for inefficiency, or even for insubordination, may be reinstated over his employer's head through outside influences—an antiquated, inefficient, extravagantly costly system that must go into the discard along with other incubi, that will be discarded under the force of the new enlightenment and renewed vision that have come to us as a result of the war. It is not enough to say that the system will be discarded. We who meet here in the interests of the conservation of our natural resources must help to bring the event about. Without reasonably adequate fire protec-

tion we only waste time in discussing methods of forest conservation, for making the forest safe for commercial trees, and thus for the continued prosperity of our lumber industries.

Cut-over and Burned-over Lands need Protection

It is not my purpose here to discuss the methods, only to point out, that fire protection, to be succesful, must be managed on the same basis as a private business; that is, in the expectation and insistence that the employer gets an adequate return for the money he invests in the wages of the employee. Such a business-like attitude is the basis of the lumbermen's co-operative associations, and they have exemplified it in accomplishment, having greatly reduced the occurrence of fires, as well as the cost of protection, on their lands. Notwithstanding this praiseworthy fact, the system has an inherent weakness, psychologically always operative, however consciously the co-operators recognize and guard against it, and it is this: Since the lumbermen pay the cost, the weight of the protection naturally falls upon the merchantable standing timber, which, both from the standpoint of hazard and the future supply, need protection the least. There are more cut-over and burned-over areas in Canada today than there are virgin saw-log areas. From the former the future supply must come, and the greatest energy of the protective efforts should be expended upon them. It is not just in any case that the lumbermen should bear the cost of protecting areas that will not, in their business life, yield them saw-logs. It is primarily a function of the government. From consideration of political *expediency*, it may be that forest fire protection will be turned over to associations of private business men. If it is, it will forever rest as an indictment against our political institutions, for it would be an acknowledgment of inability, through ignorance, inertia or incompetence, to protect public property. It is to be hoped that the provincial governments which have the keeping of the forests in their hands will not earn such a stigma.

Revenue from Forests must be Reinvested

When our forests are reasonably safe from destruction by fire, as certain portions of them already are, still other measures are required to keep them continuously productive. They must be managed with this end in view. Lumbering methods must be devised which will encourage and ensure the reproduction and give an opportunity for the full, healthy and vigorous development of the small commercial trees remaining after logging operations. Most private business is sustained only by a reinvestment of certain portions of its profits. The same principle holds for a government forest business. The Dominion Government spends about $3,000,000 a year for the

encouragement of agriculture, or, in other words, that amount is reinvested in the business of increasing the productivity of the farm soil. How much is reinvested for the purpose of increasing the productivity of the forest soil as it lies in the forest? Not a cent. Yet the value of our forest soil products is equal to the value of the wheat crop. We have already seen that Ontario and Quebec, in the past 10 years, have received $16,000,000 and $14,000,000, respectively, from their forests, but outside of fire protection and planting up waste corners in farm lands, how much have these Governments reinvested in the business of keeping the great areas of forest soils continuously productive in terms of saw-logs or pulpwood? Not a cent. We as a people accept millions for revenue from our forests, but we expend not one cent for recuperation of the logged and burned-over areas from which the future supply of timber must come.

Threatened Dangers to the Forests

I have tried to make clear to you that our fire protection in the past, and in certain regions in the present, has been so inefficient, and that our lumbering methods have been such, that we are crowding our *most valuable* trees out of the forest never to return in commercial quantities without planting. Our forests have passed through many hardships, they have been much abused: they are now in a critical condition with regard to the safety of the commercial trees. But I warn you that a still more critical period is coming—is now upon them. Successful wars are usually followed by an enormous expansion of business. War debts have to be paid, and they are paid largely by the creation of new wealth, and this new wealth will come chiefly from the agricultural lands, forests and mines. The industries of Canada are chiefly in the east. The east is the most accessible to the European markets, and it will take the greater part in Canada's share of the reconstruction trade. The forests are the most accessible of the three sources of wealth just mentioned, and they will be exploited the most heavily.

We must be resolute; we must be patriotic—and that may require more resoluteness in times of peace than of war. We must inaugurate recuperative methods at once if we would perpetuate the lumber industries, which rank third as producers of wealth in Canada, if we would make our forests safe for trees.



RIVED SPRUCE CANTS FROM WHICH KNOTTY HEART HAS BEEN REMOVED
The riving had to be done with wedges and jacks, as powder so shattered the fibres that the wood could not be used for aeroplanes.



SITKA SPRUCE LOG AT MASSET INLET, GRAHAM ISLAND, QUEEN CHARLOTTE ISLANDS, B.C.
Length, 142 feet; diameter, 9 feet at base, and 6 feet at top; scaling 52,759 board feet; approximate age, 1,000 years.

Face p. 184.

Aeroplane Lumber Production in British Columbia

BY

ROLAND D. CRAIG, F.E.

Forester, Commission of Conservation

DURING the first two years of the war, the British Government secured the lumber for aeroplane construction through the Admiralty, or from brokers, as had previously been the custom. Orders for Sitka spruce were all placed in the United States, and, though small amounts of spruce were purchased in British Columbia and Alaska by these United States brokers, the British Government was apparently not aware that British Columbia contained large supplies of the finest aeroplane wood.

In 1917 the Imperial Munitions Board established an aeroplane factory in Toronto, known as Canadian Aeroplanes, Ltd., with Sir Frank Baillie as managing director. Owing to the difficulty of securing suitable wood, Sir Frank Baillie visited the Pacific coast in the summer of 1917, and arranged for the purchase of supplies for the Toronto factory in British Columbia, securing the services of Mr. H. R. MacMillan, formerly chief forester for British Columbia, to superintend the purchase.

At the same time the British, French and Italian Governments were experiencing great difficulty in securing sufficient supplies from the United States to meet the ever increasing demands for their aeroplane factories. The requirements of the United States War Department reduced the available supply of spruce for export to an amount which jeopardized the air programmes of the Allies. The Imperial Munitions Board in Canada was then asked to secure, if possible, 24,000,000 feet of aeroplane lumber.

Commission of Conservation Supplies Information

Major Austin C. Taylor, of Montreal, was appointed Director of the Department of Aeronautical Supplies by the Board, and left for Vancouver early in November, 1917. *En route*, Major Taylor, in company with Mr. F. J. Toulnain, Inspector of Aeronautical Supplies, visited Ottawa, and secured from the Commission of Conservation the information which had been collected by the Commission in regard to the forest resources of British Columbia. This was of material assistance in guiding the operations of the Imperial Munitions Board. The Commission also loaned the services of Mr. Roland D. Craig, who had prepared

the report on the Coast district of British Columbia, to the Imperial Ministry of Munitions, to take charge of the inspections of aeroplane lumber for the Aeronautical Inspection Department. Upon the establishment of the Department of Aeronautical Supplies in British Columbia, Mr. MacMillan was appointed as assistant director.

The investigations conducted by the Commission of Conservation, showed the following amounts of Sitka spruce in British Columbia:

	Board feet
Southern mainland	1,196,860,000
Vancouver island, east coast	704,890,000
Vancouver island, west coast	3,077,100,000
Northern mainland coast	4,368,695,000
Queen Charlotte islands	4,817,800,000
	14,165,345,000

The Aircraft Production Board of Great Britain, after exhaustive tests, have found that the Sitka spruce (*Picea Sitchensis*) known in England as "silver spruce," is superior to all other woods for the construction of aeroplanes. For this purpose, wood must have a combination of qualities which it is difficult to find. It must be light in weight and at the same time strong. It must have a maximum degree of flexibility, as it is subject to sudden and severe strains, where a rigid or brittle wood is dangerous. It must also be soft in texture, so that it will yield to the impact of bullets without shattering. Sitka spruce has these qualities to a higher degree than any other known wood. It is essential that the grain of the wood be straight, otherwise it will split when subjected to strain.

Qualifications Necessary

Straight grain is the most difficult quality to get, and was the cause of more rejections than any other defect. By sawing parallel to the bark it is comparatively easy to secure straightness of grain on the edge-grained faces, the grain on these faces being formed by the annual rings, but a very large proportion of the trees grow in more or less spiral form, which causes the fibre to run diagonally across the tangential, or flat-grained, faces of the boards. Since all woods split much more readily in the radial direction, on accouut of the medullary rays, it is more important to have the grain straight on the tangential than on the radial faces. Straightness of grain on all four faces had never been asked for before in lumber, and it was with some difficulty that lumbermen were convinced of its importance.

The investigations of a number of fatal accidents in the air showed that they had been due, in almost every case, to the use of spiral-grained wood. It is difficult to detect this spiral grain by

the eye, especially in finished lumber, and in most cases it is found necessary to pull out the fibres to determine their direction. A deviation of one inch in twenty inches is the maximum allowed. That allows the grain to cross a two-inch face in forty inches. Brashy, short-fibred wood, or wood in even the incipient stages of decay cannot be used.

Owing to the necessity of reducing the size of the aeroplane component parts to the smallest possible dimensions, defects, such as pitch pockets, checks, or knots, were not allowed in the finished parts. It was impossible, however, with the facilities in the ordinary saw-mill, to eliminate all these defects without wasting much useful wood. It was decided, therefore, to accept the lumber on a shop grade, which should yield at least fifty per cent clear, straight-grained cuttings without defects, provided the defective portions could not be eliminated without spoiling useful material.

Only a comparatively small percentage of the lumber which can be used for ordinary purposes is suitable for aircraft, so that, though the amount of spruce in British Columbia is large, only a very small amount will meet these requirements. The necessity for speed in production necessitated concentrating the operations in localities where spruce forms a high percentage of the stand, is easy of access, and where the quality of the timber is high. On the mainland and also on Vancouver island, the spruce, though aggregating large amounts, is so scattered and frequently of such a rough quality that it is impossible to get the necessary supplies in the time required. On the Queen Charlotte islands, however, spruce is found forming one-third or more of the stand over considerable areas. It is nearly all close to the shore and is undoubtedly of the finest quality to be found on the Pacific coast.

The problem of getting out the aeroplane material presented many difficulties. The available timber had practically all been alienated and was held by timber owners who were not prepared to operate their claims. Very little spruce was being sawn in the province, and the available supplies of timber were situated 500 to 600 miles from the existing centres of logging operations. There were only four small mills on the Queen Charlotte islands, and none of these had ever been operated to any large extent On the mainland one small mill at Georgetown and the pulp mills at Swanson Bay and Ocean Falls were the only plants available for manufacturing lumber for this purpose. Transportation facilities for handling a large cut in the north were not available.

Cutting Rights Secured

The first thing necessary was to secure cutting rights on private holdings. The Provincial Government assisted materially in this by passing an order in council requiring timber license holders to either operate their limits or grant cutting rights to the Imperial Munitions Board, and fixing the stumpage rates at $6 per M. for No. 1 grade logs, and $2.50 per M. for No. 2 grade logs, as defined by the Munitions Board specifications. It was considered fair to pay such a high stumpage in view of the fact that the logging was done on a selective basis and only the best spruce logs were accepted.

The loggers who were operating in the fir and cedar forests in the south offered the most whole-hearted co-operation, by placing their equipment and services at the disposal of the Board. Contracts were made with the loggers on the Queen Charlotte islands on the basis of $28 for No. 1 logs and of $16 for No. 2 logs, which included the royalty collected by the Provincial Government.

Saw-mills Established

The existing mills were put in commission and improved, and two new mills on Masset inlet and three on Moresby or adjacent islands were built to saw lumber. New mills were also erected at Prince Rupert, Skeena City, Lakelse and Terrace. The output of logs soon exceeded the sawing capacity of the island mills and provided a supply for the mainland plants.

The transportation of the equipment required for these operations and for the towing of logs to the mills was no small undertaking, and the Board secured, by charter, lease, or purchase, a fleet of boats at one time consisting of 18 tugs, 22 scows, 5 barges, 2 coal hulks, and 7 gasolene launches.

The mills were operated privately, the Board selling the logs at cost price to the mills and purchasing the aeroplane lumber from them at $70 per M., with an additional bonus of $110 per M. for all lumber suitable for the manufacture of wing beams. This left, even from selected logs, about 70 per cent of the cut to be disposed of for commercial purposes by the contractors.

Transportation Difficulties

The tow of 80 to 100 miles across the open water of Hecate strait presented difficulties in towing which were overcome by making the logs up into Davis rafts. These are formed by first making a mat of logs bound together by interlacing cables and then piling other logs on this until the raft is about ten tiers deep. Wire cables are then lashed across the top, holding the raft in a tight, compact form.

In this manner a million feet can be towed quite easily and safely, even in rough water. As the heavy weather experienced in the winter in Hecate strait makes towing, even in Davis rafts, very hazardous, large supplies of logs were taken across during the good weather to supply the mills on the mainland, and it was planned to increase the sawmill capacity on the islands to take care of the cut during the winter of 1918–19.

The lumber was towed to Prince Rupert on barges or scows carrying from 150 to 450 M. There, it was loaded directly from the scows to the cars by cranes. The lumber was all in the rough, green and of very uneven sizes. Spruce is difficult wood to transport, as it checks readily if dried too quickly, and 'blues' badly if not ventilated. Great care had therefore to be taken in loading on the cars. Each tier was stripped with lath and the sides and ends of the cars were boxed in with 1 x 12-inch lumber, leaving about 1-inch space between the boards. A solid roof was then placed on the car. In this way the lumber was transported to the Atlantic seaboard with the minimum of damage. Frequently solid trains of aeroplane spruce were despatched by the Grand Trunk Pacific railway from Prince Rupert.

Rived Spruce

Owing to the difficulty at first experienced of securing a sufficient supply of straight-grained spruce logs, an experiment was tried, both in Canada and the United States, of splitting the logs into cants and removing the knotty portions from the heart. In this way material could be taken out in small pieces from places where it was impossible to remove whole logs. It was claimed, also, that the splitting revealed the angle of the grain so that it could be followed in sawing. At first powder was used to split the logs, but this was found to so shatter the wood that it was useless, and the use of powder was prohibited. The riving method proved so wasteful and expensive that, later, except in isolated situations, it was discouraged. It is estimated that the average recovery of areoplane lumber from rived camps was less than half the amount which could be secured from sawing the logs.

Douglas Fir

Though Douglas fir is heavier than spruce and more inclined to split and shatter, the scarcity of spruce led to the acceptance of fir for wing-beam stock. The fir was selected from the commercial stock at the mills and no special logging or milling operations were conducted to secure it. The recovery from the ordinary camp-run of logs averaged only about two per cent.

Production

During the first two months the factory of Canadian Aeroplanes, Limited, of Toronto, took practically the entire output from British Columbia, but at the beginning of 1918 overseas shipments were commenced.

The following statement of shipments shows the growth of the production up to the signing of the armistice, when practically all the contracts were cancelled.

	Spruce	Fir
	Board feet	Board feet
January	116,000	209,000
February	500,000	375,000
March	470,000	289,000
April	439,000	212,000
May	1,019,000	876,000
June	1,825,000	829,000
July	2,165,000	987,000
August	3,024,000	1,530,000
September	4,487,000	1,475,000
October	5,229,000	1,060,000
November	6,850,000	1,382,000
	26,124,000	9,224,000

Inspection

The inspection of all aeroplane lumber was conducted by the Department of Inspection, Imperial Ministry of Munitions, which was a distinct organization from the purchasing department, the Imperial Munitions Board. Each piece of lumber was carefully examined and marked for acceptance or re-sawing, or was rejected. The portion of each piece suitable for beam stock was also marked on the piece and tallied separately. At the close of the operations, over forty examiners and tallymen were engaged on this work.

Wood Testing Laboratory

The lack of definite information as to the effects of certain defects, and the prospect of having to find other substitutes for Sitka spruce besides Douglas fir, made the establishment of a testing laboratory in Vancouver desirable. Through the co-operation of the Dominion Forestry Branch, the Inspection Department of the Imperial Ministry of Munitions and the Provincial Government, the plant was set up at the University of British Columbia.

The Forestry Branch supplied the machinery and the superintendent, Mr. L. L. Brown; the Ministry of Munitions provided the operating expenses, including the salaries of the other members of the staff, and the Provincial Government erected the building.

The aeroplane investigations were under the control of the District Inspector of the Imperial Ministry of Munitions.

Tests were made of doubtful material sent in by the examiners, and a series of tests of Sitka spruce from different parts of the province was started. It was planned also to carry on a series of tests on Engelmann spruce, western hemlock and yellow cypress, to determine their suitability for aeroplane purposes.

Unfortunately, the laboratory was not completed until November, 1918, so that the aeroplane programme was not fully carried out. The Forestry Branch will, however, continue the operation of the laboratory along commercial lines, and will fill a long-felt need in securing definite data concerning the physical qualities of the British Columbia woods.

Need of Conservation

The supply of Sitka spruce suitable for aeroplane construction is extremely limited. It is estimated that continuance of cutting on a war basis for another year would have practically exhausted the spruce which could be secured at a reasonable expense of money and effort. In view of this fact, steps should be taken to conserve the remaining supplies of this material, otherwise it will be used for pulp or commercial lumber. Only the large trees contain the clear, fine-grained lumber required, and these cannot be replaced in centuries. Most of the aeroplane material was cut from trees 500 to 800 years old, and it is doubtful if the succeeding stands will ever attain the same quality as these virgin stands.

Medicine in War—Some Sanitary Lessons

BY

CHAS. A. HODGETTS, M.D.

Medical Adviser, Commission of Conservation

THE paper here presented deals with preventive medicine, with particular reference to the period of the war, and refers not only to the preventive medicines of the armies, but also to that of the civil population, particularly of Great Britain.

Whilst we are waiting at the doorway of the Temple of Peace, an opportunity is afforded to cast a glance over the past four and a half years of strife, misery and bloodshed and endeavour to ascertain what medicine has done, alike for the armies in the field and the army of workers at home, and how far Hygeia has done her "bit" to win the war. As one who has been within the area of war's activities, and closely observed what has been accomplished in every branch of medicine and surgery, I know whereof I speak when I say there is much to be learned, which, if only seized upon and adapted to the physical conditions of our civilian population, will materially improve these conditions.

The ready response of the medical men of the empire when Great Britain entered upon the war evidenced the fact that they recognized their responsibilities, and a large percentage willingly placed their united skill and ability at the disposal of the country for the benefit of the sick and wounded. They realized from the onset of war that their services were necessary to keep the man power to the point of greatest efficiency, if victory were to crown our efforts, be the struggle long or short. That the members of the medical profession of Canada were not behind their compeers of Great Britain is evidenced by the fact that throughout this long period they have served, not only in the Canadian service but in both the army and navy of Great Britain as well as in the army of France.

By reason of the great influx of civilian practitioners, the medicine of peace became the medicine of war and the public had the feeling of assurance that, no matter how much departmental red tape inhibited, our sick and wounded were assured of the best that medical science and skill could afford them.

There has never been assembled in one service so many skilled specialists, all engaged in team work for the prevention and cure of

disease and the practice of the art of surgery, as during this war. That the services rendered will forever reflect credit upon the medical branches of the navy and army, is conceded by all. The consultant, the specialist and the general practitioner each did his share, and, to the lasting credit of this Dominion, it may be said that Canadian doctors were not the least skilled, but were ever found in the forefront, pursuing their work with faithful earnestness, coupled with a humane sympathy and skilfulness, which will remain a lasting testimony to their ability and patriotism.

One could not fail to be impressed with the organized endeavours made to deal with the many and various groups of cases and the intensive study and team work developed under the stimulus of war conditions, both in Great Britain and France, such as the improved treatment of wounds, of fractured limbs, of fractured skulls, of eye, ear and jaw injuries; of methods for effectually treating those suffering from gas-poisoning and the unfortunate victims of shell-shock.

The combining of the art of the sculptor with that of the surgeon in the restoration of the mutilated face, and the latter co-operating with the mechanician in the perfecting of artificial limbs, are perhaps two outstanding features of the work which appeal to the public.

In giving due praise to the surgeon and physician, what the sanitarian has accomplished in the realm of preventive medicine deserves particular emphasis. It is his aim to maintain the efficiency of the fighting forces, by safeguarding their health, not only against communicable diseases, but by making their environments as healthy as the exigencies of war will permit. The soldier has no fixed abode, he is ever on the move, therefore trench, billet, camp and barracks must be in as healthy a condition as it is possible to make and keep them. This is no easy matter in a foreign country, where the normal peace conditions are not of the same high standard in sanitation as in Great Britain and where armies, equal in number to the population of many towns and cities, were being moved from place to place, often in hurried marches.

The success of the sanitarian could not have been secured except for the fact that science and action went hand in hand, carefully organized, and with power to enforce, through military law and discipline, what science dictated as right.

One striking example of this, and one which will appeal to the civilian, is the marked results obtained in the prevention of typhoid fever. In former wars, this disease wrought havoc with armies, both in field and camp. Two instances will serve to illustrate: in the South African war, the deaths totalled over 8,000 in 57,000 cases of the

disease, and in the Spanish-American war, of an army of over 100,000 men, practically one-fifth (20,734) were attacked. Compared to these incidents we find, from data available, there were only scattered cases of the fever and occasional small groups of cases in different units, while the deaths among the troops, who were under the most severe of active service conditions, were slightly below that of the civil population of similar ages and for the same period in England and Wales, where the typhoid death rate is always low.

This is but one illustration of what has been accomplished by the sanitary officers in the army in dealing with the whole group of communicable diseases, and, as a result, a higher degree of efficiency has been secured than was formerly the case in armies on active service.

Medicine and surgery are full of instructive object lessons, all of general interest, while medicine is as full of mysteries as it is of surprises to the layman, and the real truths of war medicine, when fully written, will increase his interest. At the same time, posterity will profit by the knowledge gained in the study of diseases of the nervous system, the heart, the lungs, and of many diseases more or less rare, all of which has been gained under the intensive conditions of war and accomplished by splendid team work. In the near future, we will witness another revisal, *viz.*, the medicine of war becoming the medicine of peace.

The brilliancy of surgery has certainly been enhanced, through the unparalleled opportunities afforded by the large number of casualties. The operator on brain and heart, on abdomen, eye and ear has achieved results which, in pre-war days, were beyond his hope of attainment, but what he has done under shell-fire he will now be able to accomplish in the quiet of the hospital operating room. It will be when peace is more or less sovereign of the world that the achievements of the two sister sciences will be the birthright of another generation.

The realm of hygiene, however, is the one with which we are more particularly concerned, and to understand what it has been able to accomplish it was essential to refer to those sister sciences with which it is so intimately associated. It is their particular function to care for the soldier after disease and accident have made him inefficient as a fighting unit, while, on the other hand, to the sanitarian is assigned the duty of keeping him efficient by preventing the inroads of disease.

Before the armies entered the field, sanitarians administered preventive treatment by vaccination against smallpox and typhoid fever; when they reached France they found them busy improving and protecting the water supplies, and installing the laboratories which enabled them to do the necessary check work in their oversight.

The sanitarian was already at work improving the sanitary condition of the districts through which he must pass and in which he would operate.

Here, perhaps, we have the first modern instance when Mars and Hygeia accompanied each other into war. The experience of the past would indicate that the former frequently over-estimated his strength, forgetting that disease is often a more subtle and powerful foe than any army equipped for battle. As a result, he has frequently suffered cruel ignominy and reverse.

The sanitary officers and sections could not have secured such splendid results single-handed; they have been backed up by a cordial co-operation of all branches of the service, and what, perhaps, has not always been considered, an army of men, chiefly civilians, who, in pre-war days, had imbibed some knowledge as to the importance of personal hygiene. With the co-operation of these important factors, it is not surprising that, given the proper and adequate organization required, and with ample power to enforce, successful results have been secured.

Outstanding features of the work were the laboratory facilities for early diagnosis, water examination and research work; the adoption of an inter-divisional notification of communicable diseases; the constant oversight of all water supplies, and adequate means for the sterilization of drinking water; the sanitary supervision and control of the civilian population in the area of occupation; the establishment of special hospitals for typhoid and other diseases; the diligent searching out and segregation of 'carriers' and contacts. The whole chain of sanitary measures was as complete as it was unprecedented, and was carried out by a staff composed, in the main, of civilian officers of health, for the time being serving in khaki.

Is it, therefore, too much to hope that, when these men return to civil life, they will be permitted to work unfettered by our antiquated system of Boards of Health? Will they be given a free hand to work as head and science direct?

Typhoid Fever and Anti-typhoid Inoculation

We are all acquainted with this communicable disease, and can readily appreciate its effect upon an army in the field, by reason of its destruction of life, as well as its rendering so many inefficient for further active service; by reason of their long hospital residence, it is also a severe charge on hospital accommodation.

The marked change brought about by inoculation has made this term at least familiar to the public, although, possibly, few understand the method. The anti-typhoid vaccine is a liquid containing large

numbers of dead typhoid bacilli and the toxins formed in bacillian cultures of the bacilli, and is administered by being inserted under the skin by means of a hypodermic needle. The effect is either to counteract or prevent typhoid fever, thus acting as a preventive or prophylactic.

Inoculation against typhoid was early adopted in the Canadian forces, 23,000 of the first contingent voluntarily receiving treatment at Valcartier. Its success has been amply demonstrated. Reports received clearly show that the non-inoculated soldier is much more liable to contract typhoid fever than is the inoculated; also, should the disease be contracted, the non-inoculated case is between three and four times more liable to terminate fatally. It has been found that the severity of the attack is generally much lessened, and that inoculation protects against relapses and complications, while convalescence is more rapid; also, when inoculation is performed early after infection, it reduces the virulence of the attack.

The experience of the French army is similar to that of the British. It is authoritatively stated that the number of cases of typhoid in the German army at once declined when inoculation was carried out, and so marked was the result that by the end of 1915 all the armies of the central powers had been inoculated against typhoid fever.

While giving prominence to inoculation, it must not be forgotten that the sanitary measures adopted by the military authorities were most complete. The water supplies were kept as free as possible from pollution, the hypochlorite treatment of water being followed. The laboratory provision for the making of the necessary examinations and for blood tests, etc., was excellent, motor bacteriological laboratories being used, in which the work was frequently carried out within the danger zone. Special hospitals were provided and means adopted for the protective inoculation of contacts amongst the civil population in the area of occupation and along the lines of communication, all of which were unprecedented in completeness and efficiency, forming an object lesson to the thoughtful citizen and sanitary officer as to how far they are applicable to our civilian population when exposed to the risks of infection.

Paratyphoid Fever

This is a disease closely assimilated to typhoid fever, but of a different bacteriological origin—possibly confused with typhoid. It is one of the diseases upon which considerable light has been thrown—based chiefly on experience in the Mediterranean area. It is considered of as great import as typhoid from the military point of view, since it occurs at all periods of the year, and causes a large amount of incapacity for duty.

The chief measures recommended by those who have had experience with this preventable disease are: (1) Early recognition of the clinical symptoms and early diagnosis; (2) bacteriological investigation for the early diagnosis of cases and the recognition of suspected carriers; (3) general preventive measures, such as disinfection of clothing, bedding, tents, etc.; (4) prophylactic inoculation.

If this disease is of such importance from a military standpoint, it will certainly be of great importance, for the same reason, in civil life, and our health authorities should take steps to make effective the recommendations just referred to.

Cerebro-Spinal Fever

This is an acute infectious disease of the coverings of the brain and spinal cord, and usually appears in epidemics. It is commonly called "spotted fever" because of the eruptive spots in the skin. It is caused by infection due to a germ, and is of particular interest in Canada owing to its insidious and often fatal character in outbreaks in different portions of the country.

As early as the winter of 1914–15, this disease broke out in several military training centres in England, some of the early cases being men of the 1st Canadian contingent. Its appearance created an urgent demand for investigation, and Professors F. W. Andrews, W. Bullock and E. T. Hewlett were appointed an advisory committee by the Medical Research Commission to sift and summarize the experience gained.

The committee decided that the essential cause of the disease was the one germ, the meningococcus, but they recognize that there are several types of this group.

Perhaps the chief interest to the general reader is as to how the disease is communicated from one person to another. Hitherto the carrier condition has usually been attributed to contact with a victim of the fever; now it is suggested, as a result of the collection study, that probably a large number of the carriers found in any group of contacts simply represent the proportion of carriers already present amongst the population where the case had arisen. This is a phase of the question which is worthy of closer study in outbreaks in the civilian population.

From observation made on carriers, it was concluded that the causal organism is not easily dislodged from the naso-pharynx and that carriers would be little liable to convey infection if they always took the precaution of coughing and sneezing into a handkerchief or other similar article which could be burned. The transfer of the disease by saliva is considered slight, as the steptococci, which abound in the saliva, are inimical to the disease germ.

As an example of this particular class of work, the record of the medical service of the Royal navy, on the question of carriers of meningococcus is illustrative and instructive to health workers.

"It has been the practice in the depots of the Royal navy to examine all men joining the service to determine, as far as possible, those who are carriers of the meningoccocus, although themselves in perfect hearth, and to isolate these from the main bulk of the men until they are declared clear by subsequent negative examinations. Having been found positive, two consecutive negatives allow a man to continue his duties and mix with others, but two more are required to pass him finally as clear, making in all four consecutive negative examinations at weekly intervals.

"A year's record (Dec., 1916–Dec., 1917) of 26,543 non-contacts, examined at Greenwich, led to the following conclusions:

"1. For the year 1917, the carrier rate among healthy adult officers and men was about 4 per cent (as compared with 2 per cent for the same depot, January to July, 1916).

"2. The association of large bodies of men tends to favour the development of carriers, as shown by the greater number found among drafts than among new entries.

"3. The importance of isolating known carriers as quickly as possible.

"4. The highest incidence of carriers was in May, 1917, after which it fell, and no further cases were recorded up to the end of the period.

"5. The great value of using a polyvalent agglutinating serum for the final diagnosis.

"6. The relative preponderance among the naso-pharyngeal strains of type 2 and the rarity of type 3.

"7. The occurrence of a considerable number of group agglutination reactions.

Dysentery

This disease more particularly affected the troops operating in the near East, where large numbers suffered from "the bloody flux." The chief feature upon which there has been any discussion is on the treatment of the disease. It would seem to have been directed, largely, by the laboratory examination, from which it would appear that it is not always practicable to make an immediate determination, by bacteriological methods, of the particular type of the disease from which the patient is suffering, and before beginning any particular line of treatment. The dysentery may be due to either amœban or bacillary infection, or to a mixed infection. The knowledge thus secured is of interest and importance to the medical practitioner.

Fresh Air and Ventilation

The necessity for better air conditions in the sleeping huts of the soldiers was recognized by the military authorities in December, 1914, when an order was issued that two diagonally opposite end windows, at least, should be kept open at night in each hut, the floor space allowance being 40 square feet per man. Properly ventilated barracks and ships-of-war conduce to the material reduction of catarrhal and lung affections and to the general health of the men. Indeed, the presence and frequency of catarrhal affections may often be taken as an indication that better ventilation is required. The benefits derived from ventilation are partly due to the cooler air thereby secured, as well as the improvement in the humidity, the air being brought to a more normal condition.

To learn how highly fresh air is appreciated by the soldier you have only to ask him; his opinion found expression amongst the hospital patients who, whenever possible, preferred sleeping outdoors to sleeping in a comfortable hospital ward. At the Duchess of Connaught's hospital they book the outside beds for weeks ahead, and this, notwithstanding that the wards were well lighted and properly ventilated. It is hoped the lessons learned by the soldiers as to the priceless value of fresh air and proper ventilation will be carried broadcast throughout the homes of Canada.

These are but a few of the many health subjects upon which the army has been working the past four years; others will be referred to from time to time in *Conservation of Life.*

The next group has been brought prominently to public notice through war conditions at home. Discussion has done much to emphasize the necessity for government action, through a properly organized Department of Health. Such a department, guided by the established rules of Hygeia, would include housing, social welfare, motherhood and, indeed, all that tends to make life worth living.

Physical Inefficiency

Compulsory war service revealed to the Government and to the public the serious condition of the man-power of the nation—the evil effects of modern life, both urban and rural, on the men of Great Britain. But for conscription, the people, Parliament and the leaders of Government would never have roused into action. For decades, health specialists beat the air, but without results; now the war has caused a peaceful revolution, and men's hearts and minds are moved to action, with the object of securing a higher and, therefore, a better, standard of all that makes for physical efficiency.

It was vainly hoped that England would take action along the lines now proposed, when Disraeli gave utterance to the words:—

"The *public health* is the foundation upon which repose the happiness of the people *and the power of a country* . . . . . The care of the public health is the first duty of a statesman."

The fact is that, notwithstanding all the advancement made in Great Britain for several decades in sanitary matters, both by law and in practice—and she has made marked advances—alarming conditions were revealed when the men of military age were called up for medical examination. They were placed in four grades, with subdivisions, to permit of the best that was in a man being used for war work. Those of us who have seen the men passing through the medical boards of England, and witnessed the unfits who came from good homes, from offices, workshops, factories and mines, as well as the tillers of the ground and the professional men, could not fail to be struck with a mingled feeling of alarm and disappointment at what we witnessed. The results of so-called civilization upon the men of the country were not gratifying. If such a large number were physically unfit for the defence of their country in her dire distress, they were physically unfit in the great army of toilers, and, while working in the treadmills of the nation, they were doing so at the expense of their very lives and under a severe handicap; they were compelled, with much physical suffering and by force of circumstances, to remain in the race for existence.

Only general facts have been made public, but the Government of Great Britain has become convinced of the necessity for action—immediate and upon a large scale—along broad health lines. We find the Government, in appealing for public support for re-election, adopt as one of its planks, and a very important one, Hygiene! Health! It is sufficient to quote the words of the Prime Minister, who, apparently, in times of peace, had never been impressed with the need, as his predecessor in that office had been, perhaps for the reason that he had not had the opportunity before of placing his finger on the pulse of national physical efficiency. Having had that privilege, Mr. Lloyd George said:—

"I was appalled to find that there was a higher percentage of physical 'unfits' in this country (Great Britain) than in any belligerent country. There must be a real national effort to put that right. *The health of the people must be the special concern of the State.* We cannot return to the old conditions . . ."

What applies to Great Britain applies with equal force to Canada. We are young, and in our youth have blindly copied

many of the evils which have silently, yet surely, through many decades, brought about the condition so well understood by the Premier of Great Britain. If we are to move forward in the competition of nations, under the conditions which must follow a world's peace, it is essential that we have the most efficient manhood and womanhood possible for us to secure.

Venereal Diseases

Perhaps greater public interest has been created in regard to the problem of dealing with this class of disease during the present war than all the other questions combined. A brief statement of the extent to which this class of disease prevailed in the army may be taken from the report for 1912. Of 107,000 men, the average number incapacitated was 593 daily, which represented a loss of some 216,000 working days in the year. In 1913 the rate of incidence was 5.3 per cent in the army, as against 10 per cent in the larger towns in England, as estimated by the Royal Commission on Venereal Diseases. The rate of incidence in the army for 1916 was 2.1 per cent. This decrease during active service is largely attributable to the fact that the disease is more adequately dealt with than during peace, by improved methods of education, the provision of greater facilities for recreation in cantonments, and the decrease of alcoholism, together with the adoption of prophylaxis and the early treatment of cases. Reports already received indicate that when prophylaxis is carried out as a routine the percentage of development of venereal diseases has been small.

In a paper presented at the conference on venereal diseases, in Paris in 1918, by Capt. Walker, C.A.M.C., he summarizes the result of the work of the Canadian Report Centre in Paris. Capt. Walker, who is a Canadian medical practitioner (a civilian doctor in peace times), makes some recommendations which contain much food for public thought.

The reader must for the moment remember that the soldiers coming under the care and instruction of the Centre were, for all practical purposes, civilians, for the time being only in khaki and under discipline, and were men whom the exigencies of the army required to be maintained "efficient." During sixty days (August and September, 1917) over 5,000 officers and men were on leave in Paris; of this number, 1,038, or 20 per cent, developed venereal disease. As a result, leave was stopped. On November 8, a "Report Centre" was established, when leave was reopened. All British and overseas

troops were then met at the railway station by motors, brought to the Centre, passed through the visé room, a copy of the leave pass taken and a check given each soldier. They then passed into the lecture room, were given a lecture on prophylaxis, early treatment, etc., and every soldier on passing out the door, as he gave up his check, was given a tube of calomel ointment. This tube he accepted or rejected, as he pleased. If he refused it, the fact was noted on his check, and on a copy of his pass, so that he could not subsequently claim that the means of prophylaxis had not been offered him. The number of men refusing the tubes was about one in a thousand. Over 60,000 tubes were given out between November, 1917, and March, 1918, while over 29,000 early treatments were given.

Capt. Walker stated that the actual result, from November 8, 1917, to March 31, 1918, was only three per cent of infections among the men on leave in Paris to whom prophylaxis was supplied. *Without* the adoption of prophylaxis and concurrent education, the soldiers on leave in Paris who became infected were one in every five. *With* the adoption of prophylaxis and concurrent education, the number was less than one in every thirty-three.

Thus, six-sevenths of the infections were prevented, and many thousands were returned to the army who would otherwise have become unfit for duty. At the same time, I would add that there is every evidence that amongst the civil female population in both France and England these diseases are virtually unabated.

Dr. Walker states, in regard to the infection of Canadian soldiers (the figures are his own) that, from the beginning of the war to July 31, 1917, the total number of cases was 23,248, of which 510 were officers and 22,738 other ranks, or ten per cent of the Canadian forces. Of this number, 25 per cent had contracted the disease in Canada, and 75 per cent in the British Isles or France. These figures clearly indicate the gravity of the situation, and cover only the reported cases. We have indicated the benefits of preventive medicine and, in conclusion, would ask: Are they to be withheld until the moralist and social worker can prevent the spread of the disease by means of measures we do not despise, but which, it must be conceded, do not give immediate results? Both should co-operate. The evil is deep-rooted, and is, perhaps, the result of many other social evils which medicine cannot affect. What prophylaxis can do, let it be done at once, as efficiently as possible, but let the social work be carried on as well.

The experiences of the army have demonstrated that venereal diseases can be prevented by two methods, *viz.*, prophylaxis and

scientific cleanliness. The germs of the disease at first lie on the surface and can be eradicated. Given a few hours' start and the means of prophylaxis will not reach them.

By these two practices venereal disease can be successfully combated and much suffering prevented—they are both of the preventive medicine class, and both are opposed by those who are for locking the stable door after the horse has been stolen.

In Great Britain considerable discussion has taken place, in view of possible dangers which may follow demobilization, but too much stress has been laid on the danger that the soldier may bring the disease home with him. The odds are in favour of the soldier, who is under discipline, education, and control. What I fear most is that the control of vice amongst the women at home has not lessened the danger to which he will be exposed in the cities and larger towns. It is to the civil, not the army, aspect of the question we must direct our attention. The soldier has been waging a war, with peace for its object, while the civil forces have been talking and discussing, as if we could thus prevent this or any other communicable disease. In this connection the united opinion of Sir William Osler and other leading medical men of England is most instructive, as expressed in a letter to *The Times* of December 28, 1918:

Sir,—An opportune and grave warning against the growing danger to the public health from the venereal infection that will certainly follow on the demobilization of our troops was published in *The Times* of November 25. That the danger is urgent and well-nigh immeasurable is clearly shown by the striking facts quoted from the statements made by the National Council for Combating Venereal Diseases, and is borne out by all who have practical knowledge of the subject.

In view of this daily increasing menace to the health of the nation, is it not time that the present timid and hesitating counsels, leading, as they do, to weak and ineffective action, should give place to clear advice and strong purpose?

Venereal diseases, like other infectious diseases due to micro-organisms, can be successfully conquered only by careful study of their natural history and causation, and by the translation of that knowledge into action. Extraneous considerations can have no place in sanitary problems; it is because they have had too much place that the National Council has failed. Smallpox and typhoid have been largely banished by the adoption of measures based on knowledge of these diseases. Venereal diseases should be similarly dealt with.

It has been abundantly proved during the war that venereal diseases can be controlled by the adoption of simple sanitary measures, the success of which is striking, and the materials for which can be obtained from any chemist. These measures should at once be made

known and available, and organized instruction given in their application. This is the only effective way of meeting a dangerous situation—dangerous not only for our soldiers and sailors, but for the population at large. The danger of delay is very great.

We are your obedient servants,

William Osler, Bt., M.D., F.R.S.
George Lenthal Cheatle, K.D.B., C.V.O., F.R.C.S.
James Crichton-Browne, M.D., D.Sc., LL.D., F.R.S.
Bertrand Dawson, K.C.V.O., C.B., M.D., F.R.C.P.
Bryan Donkin, M.D., Oxon., F.R.C.P.
David Ferrier, M.D., F.R.C.P., F.R.S.
Bickman Godlee, Bt., K.C.V.O., F.R.C.S.
Leonard Hill, M.B., F.R.S.
F. W. Mott, M.D., F.R.C.P., F.R.S., LL.D.
G. Archdall Reid, M.B., F.R.S.E.
James H. Sequeira, M.D., F.R.C.P., F.R.C.S.

As the report of the Royal Commission on Venereal Diseases possibly reached the public at a date earlier than at first intended, consequent on war conditions, and as reference thereto is necessary, a summary of the recommendations is appended. (Appendix XI, p. 209.)

The Commission concluded that both syphilis and gonorrhœa are much less prevalent in rural than in urban areas; that in the large cities at least 10 per cent of the population is affected.

The pronouncement by the Commission in respect to gonorrhœa deserves wide publicity, in view of the opinion generally prevailing that it is not a serious affection. More particularly would we emphasize its relationship to sterility in the female, being responsible for 50 per cent of the cases. As the mass of the people do not recognize the seriousness of the evil to the community as a whole, the campaign of prevention of these diseases is difficult, but not so great that we cannot hope to successfully cope with it. The results to be secured are worth the battle, and worthy of the great effort we must all make.

The Drink Problem

Almost simultaneous with the unity of parties to oppose the common enemy, Germany, we witnessed a united effort to grapple with the sociological questions, the most important of which was that of alcoholic beverages. The French Government at once banned absinthe. Russia eliminated vodka, and immediately rose to a higher plane of national efficiency. In Great Britain restrictions were placed upon the sale of intoxicants of all kinds, followed by beneficial results, alike to the soldier and sailor, as well as to the civil popula-

tion. Results among the latter were at once apparent. There was a considerable reduction in drunkenness and crime, and the latest returns in England indicate the convictions for drunkenness have decreased by from 40 to 50 per cent.

No one factor of social evil approaches the abuse of alcohol in its effects on human health, national energy, and the happiness of the people. The war has impressed the lesson that much of the evil lies within control, and that by controlling it the great curse of national weakness was stemmed during the war; industrial efficiency was increased at least twenty per cent, while the saving power of the British people grew from shillings to pounds.

Is it too much to hope that when peace is established the people of Canada will combine against this great adversary, and, by wise control, materially enhance the physical efficiency of our people?

While the war revealed a subtle and unprincipled foe without, the conditions forced on Great Britain revealed to the public gaze a direful health condition at home which slowly and subtly was reducing the physical efficiency of the people. Both the conditions of a world war and the revelations of the results of health inertia at home came as a surprise to the world.

That Great Britain is striving to do her duty is evidenced by the fact that her Government has guaranteed municipalities against 75 per cent of the losses incurred in the housing of the working people and is establishing a Ministry of Health—not on the narrow lines of what the public understand as public health: the term has a new and a broader, a humane and better meaning. The chief features of the bill establishing the new Ministry are:—

(1) It brings together under one Minister the health duties of the Local Government Board and the Insurance Commission, the duties of the Board of Education, so far as they relate to the health of mother and children, the control of mid-wives, and the duties of the Home Office in regard to the protection of infant life.

(2) Power is taken to bring under control of the Ministry of Health, as and when it is desirable, other considerable health duties, including the medical inspection of school children (now under charge of the Board of Education), the treatment of sick soldiers (now with the Ministry of Pensions), and the Home Secretary's powers with regard to lunacy and mental deficiency.

(3) The bill provides for the establishing of advisory or consultative councils as part of the machinery of the Ministry.

In the foregoing there is ground for the initiation, on the part of the various provincial governments of this country, of like action, if

any good results are to follow the establishment of a Federal Department of Health to direct the various agencies which will make for the improvement, happiness and physical welfare of our people. With the Federal is intimately associated in Canada the provincial machinery which operates or directs the great work of the eleemosynary institutions, which is their particular function.

RECOMMENDATIONS OF PUBLIC HEALTH COMMITTEE

In presenting this recommendation it is necessary to briefly review the actions of this Committee and the Commission since the year 1910, when it began its duties. We will merely mention the important question of unsanitary housing and the necessity of town planning, to which public attention was directed at the Second Annual Meeting, held in Quebec in January, 1911, by the Medical Adviser, who had charge of the work until the year 1914, when the valuable services of Mr. Thomas Adams were secured.

In October, 1910, a Public Health Conference was convened in Ottawa, which was attended by representatives of the various provinces of the Dominion, as well as from the Dominion. Recommendations were drawn up having for their object the establishment of a Federal Department of Health, the co-ordinating of general health work throughout the Dominion, and also suggesting a substantial monetary grant for the carrying on of anti-tuberculosis and other health measures.

An important feature of the recommendations was the establishment of a National Council of Health, to:

(*a*) Advise regarding the harmonizing of existing public health legislation in Federal and Provincial Statutes.

(*b*) Advise as to passing of new legislation or regulations in the interests of health, whether federal or provincial.

(*c*) Advise as to the nature of work best administered by Federal, Provincial, or Municipal health authorities.

(*d*) Advise as to the work to be conducted by such National Health Laboratory as may be established or that is being conducted in such laboratories as are now engaged in public health work.

(*e*) Advise Federal and Provincial governments as to the steps to be taken when epidemic disease threatens or appears within or without Canada.

(*f*) Generally to advise on such questions of public health as may from time to time arise.

The work of the National Department of Health was to include such health work as is now carried on by the several departments of the Federal Government, also:

(*a*) To investigate health problems.

(*b*) To manufacture sera, vira-vaccines, toxins, anti-toxins, and other analogous products.

(*c*) To supervise the maufacture and importation of all sera and analogous products offered for sale in the Dominion, designed for use

either in detection, prevention, or treatment or cure of diseases of man and animals and obtained therefrom.

(*d*) To investigate, through a staff of technical officers, questions relating to:

(1) The pollution of streams;

(2) The preparation, preservation, inspection, and sale of foods and drinks;

(3) The housing condition, as regards lighting, ventilation, heating, etc., of public buildings, schools, manufactories, residences, tenements, etc.;

(4) Research work, and the investigation of any other matter which, from time to time, may arise affecting the health of the people.

Early in 1911 the text of these resolutions was sent to the provincial Premiers and most favourable replies were received in comment thereon.

At the Third Annual Meeting, in January, 1912, emphasis was again given to these recommendations, also to the adoption of a uniform system for the collection of better vital statistic data, including the Dominion registration of births, marriages and deaths, and medical statisticians being employed in a Federal Department of Health for their elaboration.

Again, at the Fourth Annual Meeting, held in 1913, the Commission endorsed the proposals, and it was noted that the Hon. Dr. Roche, Minister of the Interior, had prepared a bill for introduction to the house along the lines recommended. It was at this meeting that reference was made to the good services rendered in the cause of health by a large body of social workers.

In the year 1914 the following clause appears in the Report of this Committee:

As no action has as yet been taken by the Federal Government with respect to the recommendations made by the Dominion Public Health Conference of 1910, and subsequently approved by your Committee in 1910 and 1911, it is suggested that the same or similar recommendations be again presented to the Premier of Canada.

If legislation could be secured to provide for the co-ordination of public health work throughout the Dominion, your Committee is of the opinion that a valuable service will have been rendered the people of Canada.

The result of four years' war activities has been to emphasize in a marked degree the wisdom of the recommendations as a whole. We have each and all had brought home to us questions in health and, united as an Empire, we have seen how, by reason of the Government and the people of the Motherland failing to adequately and efficiently grapple with the many problems of health, they have degenerated physically, so that when the demand was made upon them to protect their hearths and homes and the freedom and liberty of their wives and children from the onslaught of murder and rapine, masses of men have been found of a C-3 class.

Then, as if to make us realize our position in relationship to a normal standard of national efficiency and the need for doing some-

thing big to prevent further inroads of disease, squalor and vice, a most subtle foe has swept over the face of the globe, and influenza, in a few weeks, carried off many of our loved ones, most of whom were in the prime of life.

If the war has revealed the physical weakness of our manhood and womanhood, and has pointed out some of the reasons for the same, then the influenza has awakened the public to the necessity for some action on the part of the central government. The efficient and effectual work of the health officials, both in the army and at home, clearly demonstrates many of the lines along which, if action is but taken, results will be obtained.

It is not too much to expect that some decisive action, comprehensive in character, should be made at this time of so-called reconstruction. The essence of all national efficiency is the citizen of A-1 grade in health. This standard, and this alone, is the one that Canada must have now and for all time, if she hopes to maintain the proud position among the nations of the earth that the prowess of her sons has won for her and the work her men and women have achieved in field and factory.

We do not look upon health as being restricted to the narrow confines of a municipal board—it has a wider, a higher and a better purpose than the prevention of the more common epidemic diseases, important though it be. It embraces the study of all conditions which have an influence upon the life of mankind and which, either of themselves, or acting in conjunction, affect his or her personal health, comfort, welfare, and happiness, and thereby cause illness, debility or premature death, and the application of means to eradicate or prevent, and where possible, to correct and ameliorate. The scope of public health is not limited by the somewhat narrow confines of sanitation, but includes sociology and economics.

If this Committee can but push this question to a successful conclusion, it will have done more to vindicate its existence than have all of the many valuable recommendations it has made from time to time, as it will have been instrumental in securing for the Canadian people the instrument whereby health of an A-1 grade will keep up the national efficiency of a prosperous people.

On the motion of Dr. Murray, seconded by Mr. C. A. McCool, the recommendations of the Committee on Public Health were approved.

APPENDIX XI

Summary of Recommendations contained in the Report of the Royal Commission on Venereal Diseases

1. Arrangements should be made for the confidential registration of the causes of death. The proposals of the Registrar-General are commended for consideration.

2. The Notification of Births Act, 1907, should be made universally operative,* and, in the notification of still-births, a shorter period of pregnancy than 28 weeks should be taken into account.

3. The Local Government Board should devise a uniform system of records of sickness in hospitals and poor-law establishments, with the object of securing accurate statistical information as regards the prevalence of disease among persons who receive institutional treatment.

4. Statistics should be kept of the number of patients for whom salversan, or its substitutes, is provided at the public expense.

5. All institutions which undertake, with the assistance of grants from the exchequer, the diagnosis or treatment of venereal diseases should keep and render available accurate aggregate statistics regarding these diseases.

6. Extended facilities should be made available for the diagnosis of venereal diseases by laboratory methods. The organization of this service should be entrusted to the larger local authorities (county councils and county borough councils), and should form a part of the provisions of laboratory facilities, having for their object the prevention, diagnosis, and treatment of diseases in general. In any schemes framed by local authorities, the fullest use should be made of the laboratory facilities at universities and hospitals. The cost of this service should be met, as to 75 per cent from imperial funds and as to 25 per cent from local rates.

7. Measures should be taken to render the best modern treatment of venereal diseases readily available for the whole community, and the arrangements should be such that persons affected by these diseases will have no hesitation in taking advantage of the facilities for treatment which are afforded.

8. The organization of these means of treatment should be in the hands of the larger local authorities (the councils of counties and county boroughs). These authorities should, subject to the approval of the Local Government Board, organize and carry into effect definite schemes for dealing with the diseases.

9. Institutional treatment should, as far as possible, be provided at general hospitals, and local authorities should, as the first step in the preparation of their schemes, approach the general hospitals in their areas with a view to making arrangements for treatment.

---

* Since this recommendation was approved, the Notification of Births (Extension) Act, 1915, has been passed.

10. Treatment at any institution included in a local authority's scheme should be free to all. There should be no refusal to treat a patient who is unwilling to go to his own doctor.

11. The treatment afforded at any institution should not be restricted to persons resident in a particular area.

12. Special arrangements, such as evening clinics, should be made for the treatment of out-patients at hours convenient to the working classes.

13. Subject to proper safeguards, local authorities should be empowered to supply salvarsan or its substitutes gratuitously.

14. The obligation should be impressed upon all doctors, who treat syphilis and gonorrhœa in institutions or privately, to hand cards of instruction and warning to their patients. These cards should be in some such form as those given in the report, and should be provided at the public expense.

15. Medical students and practitioners should have access, for educational purposes, to the treatment of venereal diseases at any institution dealing with these diseases as part of a local authority's scheme.

16. In any case in which a local authority refuses to make provision for treatment, the Local Government Board should be empowered to make arrangements directly with hospital authorities.

17. The expenditure on schemes of treatment should be assisted by grants from Imperial funds. It is suggested that these grants should be equivalent to 75 per cent of the expenditure incurred by local authorities. The Local Government Board should be responsible for the distribution of these grants, and should lay down the conditions subject to which the grants are to be paid.

18. The provisions of Section 22 of the Poor-Law Amendment Act, 1867, should be available to secure the detention, where necessary, of poor-law patients suffering from venereal diseases. If necessary, the applicability of this section to the case of venereal diseases should be made clear by legislation.

19. Steps should be taken, wherever necessary, to render the wards in poor-law institutions set apart for venereal cases suitable and cheerful. Facilities for the best modern treatment should be provided in these institutions.

20. The means for the diagnosis and treatment of venereal diseases by modern methods should be made available in prisons. Where the medical officer of a prison considers that a local examination of a woman is necessary, it should be made by a woman doctor.

21. Arrangements should be made, through Discharged Prisoners' Aid Association, or similar bodies, for some person to keep in touch with discharged prisoners suffering from venereal disease, with a view to securing that they avail themselves of treatment and continue the treatment as long as may be necessary.

22. Men in the navy or army suffering from venereal disease, whose period of service has not expired, should be detained until

they are pronounced not infectious. If necessary, additional hospital accommodation should be provided. In cases where infectious men are entitled to claim their discharge, they should be encouraged to continue their treatment and, where this treatment cannot be provided at a Service hospital, arrangements should be made for the treatment to be continued at a hospital or clinic working in connection with a local authority's scheme.

23. No system of notification of venereal diseases should be put in force at the present time. When experience has been gained of the operation of improved facilities for diagnosis and treatment, the question of notification should be further considered.

24. The recommendations of the Select Committee on Patent Medicines, regarding the prohibition of all advertisements of remedies for venereal diseases, should be put into force.

25. The law should be amended to provide that a communication made *bona fide* by a medical practitioner to a parent, guardian, or other person directly interested in the welfare of a woman, or man, and with the object of preventing or delaying a marriage with a person who is in an infectious condition from venereal disease, shall be a privileged communication.

26. Statutory recognition should be given to the principle that infectious venereal disease constitutes an incapacity for marriage. The process should be made available for all persons, however poor. If, under the existing law, the effect of a decree of nullity is to render the children illegitimate, the new statutory enactment should provide that the disabilities attaching to such a condition should not follow.

27. Whether by means of compulsory attendance at a course of instruction in venereal diseases or otherwise, it should be rendered certain that every medical student has adequate practical instruction in these diseases. Every medical student should attend a course of practical instruction in skin diseases.

28. Questions relating to syphilis and gonorrhœa should be systematically set in medical and surgical examinations, so that the knowledge acquired in these diseases by candidates for examination may be tested.

29. More careful instruction should be provided in regard to moral conduct, as bearing upon sexual relations throughout all types and grades of education. Such instruction should be based on moral principles and spiritual considerations, and should not be based only on the physical consequences of immoral conduct.

30. In elementary schools detailed instruction in class on sexual matters should not be undertaken.

31. The practice, which has been followed by some head teachers, of having private interviews with pupils before they leave school, or, if they show special need of guidance, in order to give moral instruction and to offer warnings against probable temptations, should be general.

32. Instruction in these subjects should be provided in evening continuation schools and in factories and workshops. For this purpose, the aid of properly constituted voluntary associations should be enlisted. A high standard of efficiency and tact should

be required in the representatives of any voluntary association employed and the guidance of medical practitioners should be secured.

33. Students in training colleges should be carefully prepared to enable them to deal with these subjects. The best means of giving this instruction should be carefully considered by those who are responsible for these institutions.

34. Every man on joining the navy or army should, at the earliest possible period, be fully warned of the grave dangers which venereal diseases involve, and the warning should be formally repeated at intervals of not less than a year.

35. The National Council for Combating Venereal Diseases should be recognized by the Government as an authoritative body for the purpose of spreading knowledge and giving advice in regard to the question of venereal diseases in its varied aspects.

Educational authorities should use, for purposes of instruction, only such literature as has received the imprimatur of the National Council.

General Conclusions

We have endeavoured to make clear the grave and far-reaching effects of venereal disease upon the individual and the race. The evidence we have taken proves conclusively that these effects cannot be too seriously regarded, and that they result in a heavy loss, not only of actual but of potential population, of productive power, and of expenditure actually entailed. For reasons largely due to the special character of these diseases and the moral stigma attaching to them, it has been found impossible to present accurate estimates of the degree of their prevalence. We have, however, been able to arrive at some important conclusions in regard to their relative prevalence, socially and geographically.

The medical evidence furnishes the fact that, by early and efficient treatment, these diseases could be brought under control and reduced within narrow limits. It is beyond doubt that, on the one hand, treatment is in most cases unduly deferred, and, on the other hand, adequate facilities for the best modern treatment do not exist. Recent discoveries have armed the medical profession with means of combating venereal diseases which were unknown in the past. The object must be to bring these means to bear upon every infected person at the earliest possible moment.

We are convinced that this object can be accomplished only by the action of Government directed to the solution of a great national problem. We have recommended no drastic remedies, and, except in certain special cases, we have not advocated compulsion in any form. The measures which we propose contemplate extended facilities for bacteriological diagnosis, combined with the provision of adequate and skilled free treatment, the cost of which, we consider, shall fall mainly upon the national exchequer. These measures, if adopted without delay, will go far to remove the grave evils which our investigations have brought to light. At the same time, we hope

that the knowledge of the gravity of venereal disease which our report will impress upon the public, and the teaching which we recommend, will have the effect of inducing infected persons to make full use of the facilities for treatment, which we trust, will be provided forthwith.

The terms of our reference precluded consideration of the moral aspects of the questions with which we have dealt. We are, however, deeply sensible of the need and importance of the appeals to conscience and honour which are made by the religious bodies and by associations formed for this purpose. We believe that these appeals will gain force if the terrible effects of venereal disease upon innocent children and other persons who have no vicious tendencies are more fully realized. Our evidence tends to show that the communication of disease is frequently due to the indulgence in intoxicants, and there is no doubt that the growth of temperance among the population would help to bring about an amelioration of the very serious conditions which our inquiry has revealed. We are also conscious of the fact that overcrowded and insanitary dwellings indirectly contribute to the spread of disease, and from improvements in this direction we should expect some diminution of its prevalence. Improvements in the moral standard and in social conditions, may, however, be slow and we are convinced that upon ample provision for early treatment and readiness to take advantage of it, any real progress towards the diminution of these diseases as a most baneful factor in the national life must mainly depend.

We recognize that the measures which we propose will need for success more than legislative and administrative measures taken by Government. Continuous and consistent efforts will be required to keep the complex question of combating venereal disease before the public mind, and to secure the constant assistance of voluntary agencies concerned in prevention and rescue work. We hope that the National Council, established with this object, will become a permanent and an authoritive body, well capable of spreading knowledge and giving advice in regard to this question in its varied aspects, and that it will be recognized as such by Government.

Our report must issue at a time when all public activities are preoccupied in fulfilling the manifold needs of war. We are conscious of the disadvantage thus arising, and we feel that there is some risk that our recommendations may not receive the immediate attention which their national importance demands. We desire, therefore, to place on record our strong opinion that the conditions now existing and those which must follow on the conclusion of the war imperatively require that action should be taken without delay. There is no reason to believe that the percentage of infection in the naval and military forces is now greater than in normal times; but there can be no doubt that the total of infected persons has increased. The military authorities are doing their utmost to provide treatment; but the civil population requires corresponding measures, and all experiences shows that after a war an excessive incidence of disease is certain to occur, even in districts previously free. In order to meet present and future conditions, it is essential to make provision, and no time should be lost.

We are, therefore, convinced that it will not suffice to establish treatment centres in places where sailors and soldiers are congregated, and that these will be needed in most of the larger and in some of the smaller towns. We realize the claims of economy at the present moment; but, for reasons which we have given, we believe that all necessary expenditure will be recouped by the results which can be obtained.

Lastly, we wish to lay stress upon the needs of the future. The diminution of the best manhood of the nation, due to the losses of the war, must tell heavily upon the birth-rate—already declining and upon the numbers of efficient workers. The reason for combating, by every possible means, diseases which in normal times operate with disastrous effects alike upon the birth-rate and upon working efficiency are, therefore, far more urgent than ever before. Now and in the years to come the question of public health must be a matter of paramount national importance, and no short-sighted parsimony should be permitted to stand in the way of all means that science can suggest and organizations can supply for guarding the present and future generations upon which the restoration of national prosperity must depend.

Discussion

Hon. E. A. Smith (Minister of Lands and Mines, New Brunswick): The Commission is to be congratulated on the results which have been obtained since its organization. The conditions brought about by the world war make it important that we conserve and develop the natural resources of our country.

I am more interested just at this time in the conservation of the forests. As you all know, I have been Minister of Lands and Mines in New Brunswick for the last two years. Previous to taking over that portfolio, I had not given much time to the study of conservation in any of its branches. I found that the forests of the province—one of our greatest natural resources and almost our only source of revenue—had been more or less exploited. During the last few years logging operations in New Brunswick have been conducted with great carelessness. While our forests are not near depletion, we are at the point where conservation must be practised. We have no more virgin forests—all our lands have been cut over, and the time has arrived when we must conserve that great endowment which the Architect of the universe supplied us, and it is our intention to put an end to careless logging operations.

At the last session of the Provincial Legislature, a comprehensive Health Act was passed. Hon. Dr. Roberts, our Minister of Health, has given his whole heart to the work, and we have, perhaps, one of the most comprehensive and up-to-date Health Acts in the Dominion.

We are a new Government, but we have put through some very advanced legislation. Our Premier, Hon. Mr. Foster, is a thorough business man. Before he was elected he stated that, if returned to power, he would run the government on business principles, and he has done so.

We have some coal mines in our province, but the coal is of a superficial quality. We are unlike our neighbour, Nova Scotia, which has such immense coal areas; but we have the Grand Lakes area, which has not yet been explored. Last year we encouraged the miners to double the output, producing 300,000 tons. We have never, as a Government, attempted to find out just what coal we have. Estimates of our coal resources are simply guesswork. This year an appropriation is to be made, with a view to exploring these coal-fields and having our diamond drill cover the whole area. Before the Canadian Forestry Association in Montreal, I stated that, if we found our licensees were cutting more than the natural increment of our forests, the Government would be compelled to curtail that cutting. I make the same statement in reference to our coal-fields. We have licensees today who have sufficient land under lease, which, at the rate of mining carried on during the last three years, will give them a reserve for from 250 to 350 years. That is not conducive to development of our mines. We are going to explore these lands, and, if it is found that coal-bearing areas held by licensees are lying undeveloped, we shall have to transfer them to those who will develop them.

I hope to be here next year, and, at that time, to be able to give you the results of the proposals we intend to carry out. For the present, it is sufficient for me to say that I am in perfect accord with the objects of this Commission, and note with pleasure its accomplishments along the line of conservation.

Hon. O. T. Daniels (Attorney-General, Nova Scotia): The report of the work of the Commission for the past year, as presented by the Assistant to the Chairman, is certainly a splendid one, and will well repay a careful reading when we receive the report of the convention and have a chance of examining it at our respective homes.

I am here, sir, to see if something cannot be done to assist in fire protection in Nova Scotia. Our province has 12,000,000 acres of land, over 9,000,000 acres of which are covered with forests; therefore, the problem of forest protection is a very acute one with us. There is one respect in which I think this Commission can render great assistance to Nova Scotia, and, indeed, to every province of

the Dominion. I have reference to the fires caused each year through the operation of the Dominion Government railways. We have statistics running back four years, and you will be alarmed when I tell you that the fires caused by the operation of these railways have resulted in greater damage than the fires from all other sources throughout the province. No doubt, the same thing applies in New Brunswick. The Intercolonial railway has been the cause of the destruction of millions of dollars worth of the best timber in the Maritime Provinces. We have never had any assistance from the Dominion in this respect, and I think the time has now come when we should. Last year, our total fire damage in Nova Scotia amounted to $139,000, nearly $80,000 of which was caused by locomotives on the Dominion Government railways. How can we be encouraged to conserve the forests of our province if the Federal Government does nothing to help us? The Commission of Conservation should see that the Maritime Provinces are assisted in this respect. You have heard the observations in regard to the protection of forests in New Brunswick. It is a great pleasure to realize what has been done in that province, which is a pioneer in the matter of forest protection. We are the oldest province of Canada. Before we entered Confederation, practically all the land in Nova Scotia that was worth anything had been granted to settlers. We are doing our best to deal with the problem of conserving our forests, but we need the co-operation of those who are in a position to assist us. It is most necessary that we have financial assistance from the Railway Department or from the public treasury of Canada in our work of protecting the forests against fires caused by the Government railways.

Dr. Bryce: The legislation that we secured in the west a few years ago, with regard to fire protection, has been a great boon. The Canadian Pacific railway has co-operated very heartily, and I believe that they have succeeded in largely preventing fires. In the far Northwest, new railways are being built that do not come under the regulations of the Railway Commission in this respect. It will be remembered that, two years ago, when the solicitor for the Canadian Pacific railway requested that there be some relaxation in these regulations for guarding against fire, he was met with a very firm reply. I hope that something can be done along the line of Mr. Daniels' suggestion.

Mr. James White: As far as the Commission is concerned, we shall be only too pleased to do anything we can to assist Mr. Daniels in this matter. The Government has promised to place the Inter-

colonial, Transcontinental and Prince Edward Island railways under the Railway Commission, and subject them to the same regulations as are effective in respect of the other Dominion-chartered railways. We hope also that it will be possible to have a provincial forester appointed for Nova Scotia. I do not know whether Mr. Daniels can give us any light on the possibilities of getting a competent man to perform such duties.

Hon. Mr. Daniels: I would not want to, because I would have more applications than I could deal with.

Water-Power and Fuel Problems

BY

ARTHUR V. WHITE

Consulting Engineer, Commission of Conservation

IT has become clearly recognized that cheap power is one of the basic factors enabling manufacturing countries successfully to compete in the world's markets.

Before taking up this special phase of our discussion, I shall briefly refer to a few subjects in which, during the past year, this Commission has been specially interested. These are: The applications involving the use of additional water for power purposes from the St. Lawrence river; the completion of the Calumet-Sag portion of the Chicago Drainage canal; the increased development of power at Niagara Falls; the complete apportionment of the total allotment of water at Niagara under the Boundary Waters Treaty; the increasing erosion of the Horseshoe fall; anticipated new developments and market for electric power; detailed water-power investigations in the province of New Brunswick and other cognate matters.

ST. LAWRENCE RIVER APPLICATIONS AND DEVELOPMENT

Since its organization the Commission of Conservation, as its publications clearly show, has been actively interested in having the integrity of the Great Lakes system preserved, and, in this connection, has consistently striven to have development of these waters made according to a unit scheme and in such a manner as will result in their efficient utilization by all interests concerned on both sides of the boundary.

During the past year two important applications, involving increased use of the waters of the St. Lawrence river, were heard by the International Joint Commission. One application was by the St. Lawrence River Power Co., a subsidiary organization of the Aluminum Company of America. Without having previously brought the matter officially to the attention of the Government of Canada, the St. Lawrence River Power Co., under permit from the United States War Department, constructed extensive works in the bed of the St. Lawrence river, and then, subsequently, applied to the International Joint Commission for authority to erect, in the South

Sault channel, a submerged weir or dam, which constituted the completing feature of their project, as commenced a year before. The company contended that this structure was absolutely necessary as a "war measure." The Dominion Government, represented by the Solicitor-General* and counsel, Canadian shipping interests, the Commission of Conservation, and other organizations, urged most strongly that any granting of privileges under the application should only be upon such terms and conditions as would leave the Governments of both countries, and not a private corporation, in control of the situation, including control of any structures which, as a strictly "war measure," might be authorized. The Commission of Conservation has been, and is, absolutely opposed to the granting of control of the St. Lawrence river to private interests. The International Joint Commission eventually gave decision granting the company the right, for the duration of the war, or for a period of five years, whichever term should be longer, to erect and maintain the structure for which the petition was made.

The other St. Lawrence River application is by the New York and Ontario Power Co., for the erection of a dam in the Little river, a channel between Ogden island and the United States main shore. The proposed structure is to replace, or, to be in lieu of, a dilapitated dam now existing in this channel, under rights which, the applicant claims, have been existent for over 100 years, and which rights, the applicant also claims, are still of force. This application is still pending.

During the past year consideration has been given by United States federal authorities to proposed legislation relating to the development of water-powers according to some national policy. When legislation releases water-powers on the navigable rivers of the United States—the development of which has been tied up for years—fresh impetus will be given to this development. In this connection, especial interest is already being manifested in both Canada and the United States respecting joint development of navigation and water-power in international waters, chiefly the St. Lawrence river. Any national boundary water policy of Canada, involving the St. Lawrence river, is of vital relationship to every citizen of the Dominion.

Such rights as were conferred in the case of the St. Lawrence River Power Co's application are, when once granted, difficult to

*For Statement of Hon. Hugh Guthrie, Solicitor-General, setting forth the position which the Government of Canada takes in regard to the application of the St. Lawrence River Power Co., consult, appendix III, pp. 77-86 *ante*; also *Hearings in the Matter of the Application of the St. Lawrence River Power Company*, 305 pp., 8vo., Ottawa, 1919. pp. 39–41; and for his *Argument*, pp. 126–135.

See, also, in this *Annual Report*, Appendix II, pp. 71-76, and appendices IV and V, pp. 87-94.

control. An excellent illustration is found in the illegal diversion of water from the Great Lakes system through the canal of the Sanitary District of Chicago. During the past year, the Calumet–Sag portion of that canal system, providing for a still further increased diversion of water, was completed. The Sanitary District's works take water in excess of its permit, and it has not been prevented from so doing. At Niagara Falls, the diversion of water is limited by treaty, and government officials entrusted with jurisdiction in this matter have seen that diversions are not in excess of authorized quantities.

Niagara River Power Situation

Hydro Electric Commission Chippawa Project

During 1918, notable changes have taken place in the power situation at Niagara Falls. The Chippawa-Queenston project of the Hydro-Electric Power Commission of Ontario is being rapidly advanced. The development is to consist of six units of 50,000 h.p. each, giving a total of 300,000 h.p. The total head from lake Erie to lake Ontario is about 330 feet, of which the new plant has a gross head of 316 feet and utilizes a net effective head of 305 feet. The plant will utilize 10,000 cubic feet per second, conveyed through $12\frac{3}{4}$ miles of canal, of which $4\frac{1}{4}$ miles is canalized river section and $8\frac{1}{2}$ miles is excavated canal. The earth excavation is 11,000,000 cubic yards, and the rock excavation 4,000,000 cubic yards. The deepest cut is 145 feet. The excavated portion has a width of 48 feet in the rock section; in the earth section it has a width of 162 feet at the top, and about 84 feet at the mean water line. The gradient is 1 foot per mile, and the velocity in the rock section will be about 6 feet per second when the plant is under maximum load. Surveys were commenced in 1914, construction in 1917, and it is hoped that the work will be completed in 1921; estimated cost, about $25,000,000. It is expected that the operating hydraulic efficiency of the turbines will be about 93 per cent, and 30 to 31 horse-power per cubic foot of water will be obtained. The over-all efficiency of the plant, it is hoped, will exceed 90 per cent. This is a great undertaking, and no effort is being spared to include in it the latest and best in development.*

The new 14-foot pipe line of the Ontario Power Co. is nearly completed. While the power-house of the new units to utilize the water from this conduit cannot be available for several months, it

* For description of Chippawa-Queenston power development, consult "Chippawa-Queenston Power Development," in *Canadian Engineer*, Toronto, June 20, 1918; also "Canada Rushing Huge Niagara Development as War Conservation Measure," in *Engineering News-Record*, New York, Oct. 31, 1918.

is expected that the supply of water through the conduit will be utilized to alleviate conditions in the main power-house.†

Hydro-Electric Commission Audit

The work of the Hydro-Electric Power Commission of Ontario, since its inception, has been an especial object of attack by some opposed to public ownership. During the past year, the Provincial Government completed a special audit of the financial operations of the Commission. With respect to this audit—which was made partly as a result of adverse criticism—the *Toronto Daily Star* editorially stated as follows:

"In view of the persistent suggestion made in print and out of it—but especially out of it—and in conversation here and there, that the Hydro-Electric was not on a sound footing, and was not paying its way, the Government appointed Mr. E. R. C. Clarkson to audit its books. Mr. Clarkson reports that the Hydro does much better than pay its way, and has a substantial surplus on hand.

"There are some people who like to knock the Hydro—never believed in it, and never intend to. They predicted that it would fail, that it would be mismanaged, and even the wonderful success it has attained has not convinced tham, They do not want, and do not intend, to believe that public ownership can be a success, except, of course, in connection with a waterworks system and service—although wherein water differs from light and power and transportation in the streets, and telephonic and telegraphic communication and other things, no fellow can find out. The report of the audit made by Mr. Clarkson, however, will quite satisfy most people that the Hydro-Electric is a successful and profitable enterprise, and with excellent prospects ahead."

Niagara Falls Power Co., New York

On the United States side of the river the Hydraulic Power and Manufacturing Co., the Niagara Falls Power Co. and the Cliff Distributing Co. have been consolidated. The dominating interests are those formerly controlling the Hydraulic Power Co., although the name selected for the new company is the Niagara Falls Power Co. The consolidation also includes the Canadian Niagara Power Co. on the Canadian side. The new company has an installed capacity of about 370,000 h.p., and is installing an additional 100,000 h.p., consisting of three units, delivering, under conditions of maximum efficiency, 33,000 h.p. each. This plant is expected to be ready for operation in 1919, and will, it is hoped, have an operating hydraulic efficiency of about 93 per cent. It may be commented that the greatest localized waste which now exists in connection with high-class hydro-electric plants is from the turbine runner to tail-water and may be said to amount to from

† Consult "Extension to the Ontario Power Co's Plant," by Thomas H. Hogg, *Canadian Engineer*, Jan. 16, 1919.

3 to 5 per cent. Special refinements in design and construction are being introduced to regain part of this loss.

With respect to the new plant, it is hoped that the increase of hydraulic efficiency to 93 per cent may be secured by regaining 2 or 3 per cent of the power from the water in passage through the draught tube. The new 100,000 h.p. plant occupies about one-third of the space formerly required by equipment of similar general type and capacity. The Hydraulic Power Co. had previously made special efforts to advance hydro-electric development and to utilize the water of the Niagara river allotted to the company under conditions of best efficiency. Its present large power-house uses the water *per se* more efficiently than any other power plant now existent at Niagara on either side of the river. A clear distinction should, of course, be made between the efficiency of a hydro-electric development and the efficiency of the utilization of the water *per se* by the plant. A number of power installations, for example, may have an efficiency approximating each other to within, say, 10 per cent, but with respect to the efficient utilization of water there may be differences of almost anything. The Niagara Falls Power Co., in its new plant at Niagara Falls, will utilize approximately 70 per cent of the fall between lake Erie and lake Ontario, and claims an efficiency of at least 20 horse-power for every cubic foot of water.

In connection with this new plant a collecting basin is being constructed from which the discharge water may be drawn off by a tunnel, which it is proposed to cut through the angle formed by the lower Niagara river, and to terminate on lake Ontario in a power-house for developing power from water now flowing down the lower river. The company claims that this two-stage development gives proper consideration to investment in its existing newer plant; constitutes a truly economical treatment of the allotted water in its total fall from lake to lake, and in fact is, practically, the equivalent of a development of the full head at a single site. When the company actually constructs this plant for utilizing the remaining head of the lower river, it will move out of the class of Niagara developments that have simply "skimmed the cream" by making the easy and cheaper developments at the falls. The company plans ultimately to install at the falls seven additional units, each of the 33,000 h.p. type, to supersede the regular use of the less efficient portions of plants acquired under the consolidation.

Proposals for Increased Diversion

The water of the Niagara river allotted under the Boundary Waters Treaty—56,000 cubic feet per second—has all been apportioned to developing interests. It has been stated that efforts are to be made to change the terms of the present treaty. One recent proposal is that, under a new treaty, each country shall be permitted to divert 60,000 cubic feet of water per second—which corresponds to approximately 1,800,000 electrical horse-power—assuming 30 horse-power per cubic foot of water.

In connection with proposals for increased diversion attention has frequently been drawn to marked physical changes taking place at the Horseshoe fall. The water has been receding from the heels and concentrating in an accentuated V-shaped channel at the toe of the horseshoe. Suggestions have been made that action should be taken to preserve the scenic beauty of the falls, especially of the Horseshoe fall, because, if the breaking down of the crest line of the falls continues after the fashion prevailing for the last few years, the impairment of the scenic grandeur of the falls will be very serious. One suggestion is the placing in the river of submerged diversion weirs or vanes, by which the water will again be distributed over the whole crest of the falls.

Erosion of Horseshoe Fall

Mr. John L. Harper, chief engineer of the Niagara Falls Power Co., in an interesting and succinct manner, draws attention to this subject in a recent pamphlet, *The Suicide of the Horseshoe Fall.* Mr. Harper states:

"The 'American,' or lesser fall, carries only slightly more than five per cent of the total discharge of the Niagara river, and yet it forms at least twenty-five per cent of the total scenic spectacle.

"In these days, when engineers do not shrink from undertaking what has seemed in the past to be impossible, it should be the policy of those controlling the falls at Niagara to have constructed in the bed of the river, above the Horseshoe fall, invisible current deflectors, which would make impossible the gathering of the whole river into a deep, narrow gorge, and would again deflect its water over the sides and heels of a re-established horseshoe, not only improving the present spectacle, but causing the whole contour of the fall to wear uniformly, so that coming generations, in viewing its beauty, may also have before their eyes the emblem of good luck. . .

"From actual observations, made during the past ten years, it is known that the crest is receding at the point of greatest erosion at the rate of approximately eight feet per year, while, on the sides and heels, almost no recession is noted. . . .

"The American fall, with its outflow of five per cent of the volume of the river and one thousand feet of crest, can be maintained exactly as it is now. Thirty-five per cent of the outflow of the river can be properly distributed over the three thousand feet of crest of the Horseshoe fall, covering it with a cascade more than twice as deep

as that of the present American fall, and, with the much smaller amount of water, produce a scenic effect equal in grandeur and greater in extent than the present one. This would, at the same time, arrest the destruction of the beauty of the horseshoe shape, which is now daily disappearing under the eroding forces of the misdirected torrents, and the loving and courageous hand of direction would replace the wastefulness and destruction which must follow negligence and inaction."

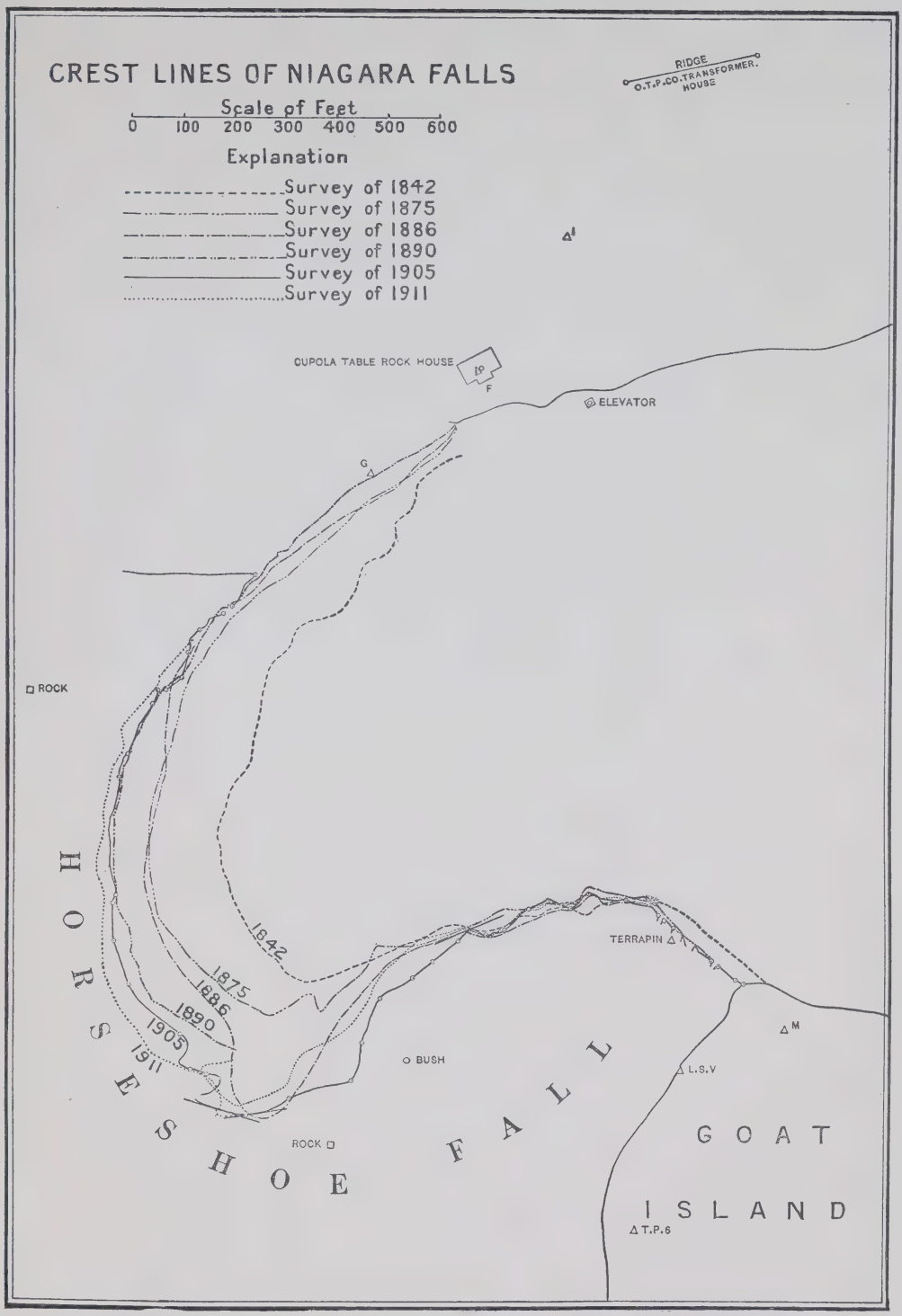
If the preservation of the scenic grandeur of the falls is really desired, certainly it is not being attained if the Horseshoe fall continues to erode as at present.

Anticipated Water-Power Developments and Market for Electric Power

Hope is expressed by many that, during the next few years, there will be throughout Canada an almost unprecedented activity in water-power development. In this development all the provinces, according to the measure of their respective possibilities, will participate. In view of the large amount of electric power absorbed by manufacturers of munitions of war, it has been concluded by some that after the war there would necessarily be a large unused surplus of power, and that this condition would maintain for a considerable period. This conclusion, however, appears to be unwarranted.

Respecting the power used by munition plants, one is apt to overlook the very important fact that a considerable block of this power was only made available by taking away a percentage of the power being used by municipalities and by manufacturers not engaged upon strictly war work, and also, by checking such growth of power consumption as normally takes place. To make electric energy available for munition work, municipalities in the Niagara district of the Hydro-Electric Power Commission were required to reduce their consumption from 15 per cent to 30 per cent below their respective maximum demands of December, 1917. Toronto was thus reduced by 7,000 h.p., Hamilton 2,000 h.p., London, 1,500 h.p., and other municipalities by amounts totalling 7,000 h.p., Thus municipalities were curtailed to the extent of some 17,500 h.p. from their load maximum demand of about two years ago, and, in addition, consumers were not permitted to take advantage of such increased growth of consumption as would naturally have occurred during the same period.

In addition to this curtailment of natural growth, new enterprises were unable to contract for power, and some companies, such, for



Surveys of 1842 to 1905 reproduced from map published by United States Geological Survey in Bulletin No. 306.

Face p. 224.

example, as the Beaver Wood-Fibre Co., of Thorold, which had a new contract for an extra 5,000 h.p., were unable to secure same. This company is now pressing for delivery of this 5,000 h.p. The National Abrasive Co., of Niagara Falls, has contracted for 2,500 h.p., which they have not yet received. Several industries in the Essex-Kent peninsula are ready to take some 4,000 to 6,000 h.p. additional power. A number of smaller municipalities have also been waiting to take on new loads, which would result in immediate permanent business for the Commission of at least 4,000 h.p.

Again, there may be some adjustment respecting temporary contracts, such as those with the Toronto Power Co., whereby the Hydro-Electric Power Commission may be deprived of some of the power it has been using.

Another aspect of the situation is that a number of the largest consumers of power, such as the American Cyanamid Co., of Niagara Falls, Ont., which has a firm contract for 26,000 h.p., and, during the war, has been making chemicals for the United States, will resume its production of fertilizers and other chemicals. The Electro-Metals Co. will continue to use its present 11,000 h.p., and possibly, 30,000 h.p. The Union Carbide Co., with its firm contract for 16,000 h.p., will probably resume its pre-war activities, when, at times, off-peak power was used up to 40,000 h.p. The Ontario Paper Co., of Thorold, which has a peak contract for 3,500 and an off-peak contract for 11,000 h.p., desires additional power.

Having in mind the facts just mentioned, and excluding the large Niagara Falls companies to which reference has just been made, it may be summarized that, the Hydro-Electric Power Commission, on account of the cessation of the production of war munitions, will now lose loads probably totalling some 35,000 to 40,000 h.p.—really corresponding only to a loss on peak load of about 25,000 h.p. On the other hand, it is clear that whatever power is now being released, and which is resulting in relieving the almost intolerable peak load conditions which have lately maintained, will readily be absorbed in overtaking the curtailments of usage and growth in power consumption which were placed on municipalities and others.

It is further believed that a portion of the 50,000 h.p. additional which is being made available by the Ontario Power Co.'s third pipe-line will be required to meet early demands of such consumers as above referred to; in short, that the past experiences with respect to power demands will be repeated in the future.

Proposed New Legislation Respecting Water-power

There is under consideration much new legislation and regulation respecting the development of water-powers. In the United States, there are several bills before Congress suggesting means for the better utilization of existing electrical and mechanical power and for the development of new sources of such power; also for the acquisition by expropriation of property and rights necessary for the improvement and increase of facilities for the development, transmission, distribution, and supplying of electrical energy; also for the control and regulation of the use of boundary waters of the United States for power and other purposes. Such activities demonstrate a recognition of the great importance which attaches to hydro-electric power.

In Canada, the Dominion Water-power Board, created—by order in council of April 25, 1918, under the chairmanship of Hon. Arthur Meighen, Minister of the Interior—for the purpose of assisting the Government to take prompt and constructive action to provide for the future fuel and power needs of the country, and to assist also in co-ordinating governmental activities relating thereto, had under consideration at its first general meeting the problem of co-ordinating certain legislation and regulations relating to water-power development in the various provinces.

The Sub-committee on Water-power Development of the Chamber of Commerce of the United States, in 1918, published its report, in which it draws attention to a number of special engineering and economic aspects of power development.

Certain recommendations regarding the fundamental points in connection with a federal policy designed to accomplish what the committee regards to be highly beneficial results in the public interest, are as follows:

I.—As to all developments, whether within or outside the public domain, a separate Act of Congress should not as at present be required for each development; but the authority to issue permits should be vested in some department or commission designated for that purpose and under conditions protective of the interest of the public and of the investor.

II.—Permits should be issued for a period of at least 50 years, unless at the option of the applicant a shorter period is agreed upon, and should be irrevocable except for cause.

III.—A toll should be imposed by the Government only on power developments on the public domain or benefited by headwater improvements maintained by the government. Such tolls should be based upon the horse-power actually developed, used, and sold. The

tolls should be reasonable, and proportionate to the benefits actually derived.

IV.—If public lands form only a small and incidental part of the entire development, the licensee should be entitled to acquire the right to use such lands, paying the government fair and just compensation for such use.

V.—At the expiration of the license period, the government should have the right to recapture the property for itself or for a new licensee upon the payment of fair and just compensation for the property and for all dependent property, if taken; and if the dependent property is not taken, then fair and just compensation should be paid for all severance damages.

Provision should be made that, all things being equal, the original licensee have priority over any new licensee.

VI.—At the expiration of the license period, the government should (1) agree with the licensee as to the terms of a new license, (2) recapture for itself or for a new licensee, or (3) continue the license under the original terms.

VII.—Rates and service should be regulated by state commissions, where the service is intra-state; and only by federal authority where the service is inter-state and the commissions of the states which are directly concerned do not agree or there is no state commission.

The exercise of any federal jurisdiction over the issuance of securities would be unnecessary and unwise.

VIII.—No preference should be allowed as between applicants, whether a municipality or otherwise, which amounts to the granting at the expense of the government of a subsidy creating unequal competition in the same market.

Water-power Investigation in New Brunswick

During the past year, the Commission was again consulted by public organizations in the province of New Brunswick respecting the utilization of water-powers within a radius of certain centres requiring additional power. As Consulting Engineer, I visited the province and, in brief, advised that the work of stream investigation, etc., being undertaken by the new Water-powers Commission of New Brunswick, was along satisfactory lines, and should result in placing the authorities in possession of such information as would, at an early date, enable them to appraise upon an economic basis the possibilities of water-power development in various localities.

National Saving of Fuel and Power

The European war has resulted in impressing upon us the vital importance of coal. Practically all industry is dependent upon coal. The United States, producing practically half the present world coal consumption, has, through its Fuel Administration, been com-

pelled to curtail coal consumption by cutting off unnecessary or wasteful uses, and by requiring, wherever possible, consumption only under conditions making for increased efficiency.

Enormous Coal Production

In endeavouring to convey an idea of the enormous quantity of coal produced annually by the United States, the Fuel Administration, in 1918, stated:

"Every year the miners go into the ground and dig out coal, and the railroad ships it for hundreds of miles, dragging back the empty cars, until the amount mined is $2\frac{1}{4}$ times the earth and rock removed in digging the Panama canal. It took sixteen years to dig the Panama canal. The miners will dig $2\frac{1}{2}$ Panama canals this year."

During the battle of Verdun, the French fired 60,000,000 shells, containing nearly 1,800,000 tons of steel, the production of which consumed nearly 9,000,000 tons of coal, equal to 25 per cent of Canada's annual consumption. Throughout the war, the coal situation has been *the* factor governing the production of manufactured articles. Every large coal-producing country, except the United States, found it impossible to maintain the pre-war production of coal.

Canada, like the United States, has striven to reduce her fuel consumption, but, being still dependent upon the latter for 22,500,000 net tons—including over 5,000,000 tons of anthracite—out of a total yearly consumption of 34,800,000 net tons of coal, it is clearly incumbent upon Canada to apply every means within her power to utilize coal in the best and most efficient manner. This, besides being an evidence of common-sense, will also result in the saving of a large amount of money now lost in coal wastefully used.

Fuel Restrictions and Economics

"Heatless days;" the times when gasolene could not be used; the denial of fuel for certain luxuries, as use on private yachts; the curtailment of fuel for the manufacture of such apparatus as musical instruments, talking machines, etc.; the allotment to florists for greenhouse purposes of only 50 per cent of the fuel they were accustomed to receive; the compelled use in certain districts of wood for fuel; the restrictions upon the use of natural gas; the prohibited use in many cases of anthracite coal and the substitution therefor of bituminous coal; the day-light saving legislation on both sides of the Atlantic; the cutting down of illuminated advertising and the enforced "lightless nights;" these and many other facts must be held in mind as indicating how widespread and absolutely necessary have been the efforts for economy with respect to fuel.

Although the efforts of the fuel administration, the termination of hostilities and a providentially mild winter, have reduced the great stress in the fuel situation, nevertheless in the period of reconstruction

and afterwards, the demand for fuel will doubtless be such that many of the restrictions placed upon its use and conservation during the war period will, in one form or another, find permanent expression; and hence are here to stay.

In Europe, the great lesson of how to use coal economically has been learned. As a leading United States journal recently stated:

"They have learned how to use coal economically in Europe through having to pay all the way from $20 to $90 a ton for it. The man who is paying that does not need any fuel administration to urge him, on patriotic grounds, to stop wasting coal. He develops the keenest interest in that subject without prompting and he saves the coal."

The writer declares that the United States Government does not propose to dispense with its regulation of the coal industry, and adds:

"The Government will not take its hand off; it wants poor people to have a chance of fuel too. It gives the people the benefit of an inexorbitant price. They ought to show their appreciation by using the coal just as carefully as though they were paying the European price."

Canada has by no means wrestled as she should and must with the solution of her national fuel and power problem. Peat-producing equipment is being constructed, and the building of a lignite briquetting plant is under consideration.* These efforts, which are in the right direction, should be given the best possible support, but they should have been undertaken and consummated years ago. While waiting for lignite production, etc., for relief, Canada, by properly applying the lessons of the past fuel shortage, may effect economies in the use of fuel which will result in saving much greater quantities of coal than will be produced by such peat and lignite plants as may be in operation within the next few years.

We desire, therefore, to emphasize the need for making every reasonable improvement which will result in the saving of fuel. The best possible efforts, under government and other expert engineering guidance, should be made to make permanent such economies as have been demonstrated through the efforts of fuel-controlling and other organizations in European countries, in the United States, in Canada and elsewhere. Let us consider some of the chief means by which these economies have been and may be effected:

* Consult *Carbonizing and Briquetting of Lignites*, by W. J. Dick, Commission of Conservation, Ottawa, 1917; also, by same author, "Canada's Own Coal and the Fuel Problem," in *Industrial Canada*, April, 1918; also *The Briquetting of Lignites*, by R. A. Ross, Honorary Advisory Council for Scientific and Industrial Research, Ottawa, 1918; also, *Fuels of Western Canada and their Efficient Utilization* (revised edition), by James White, Commission of Conservation, Ottawa, 1918.

Saving of Power and Light in Factories

Efforts were made by the United States Fuel Administration to induce several coal-using factories to effect economies in light and power by the utilization of more efficient lamps; the cleaning of dirty windows; the rearrangement of machines and shafting and the proper alignment of shafting; changes in elevator service; insulation of steam piping and cutting out unnecessary steam lines; grouping of machines in a manner to flatten as much as possible the load curve; testing of power circuits for relationship of capacity with a view to their better inter-connection; stopping of motors when the attached machinery is idle; correction of motors and other apparatus out of adjustment; installing of proper protection about doors, windows, elevator-shafts and stair areas, etc. Such efforts have resulted in effecting a coal saving in factories of from 11 to 34 per cent.

Elimination of Uneconomical Plants and Processes

In the United States there were found in factories, office buildings, hotels, apartments, institutions, hospitals, etc., about 30,000 local electric-generating plants. Many were readily supplied from some adjacent large central station. Where changes were made a general fuel saving of from 20 to 60 per cent resulted. Effort is made to treat each case on its individual merits. By way of illustration, in Chicago the Power and Light Committee induced the Chicago and Western Indiana railway to close its pumping plant and substitute electric power. The Sanitary District Power Co. was induced to enter into an agreement with the Commonwealth Edison Co. Chicago now uses the Sanitary District water-power at its largest pumping station. By these three changes an estimated annual coal saving of 73,550 tons will be effected. A corresponding consolidation supplied with power from the Keokuk plant effected a yearly saving of about 110,000 tons.

Direct Heating for Industries

Fuel is being saved in industrial furnaces where used for direct heating, such as is necessary in the clay products industries. The United States Fuel Administration estimates a probable annual coal saving of 3,000,000 tons.

Refrigeration

Fuel economies can be effected in the ice-manufacturing and refrigerating industry, where, by way of illustration, it takes less power to produce opaque than clear ice, the former being quite satisfactory for many purposes.

Steam Turbines

The efficiency of a modern steam turbine approaches 80 per cent, although the terminal efficiency—that is to say, the ratio of the heat units equivalent to one kilowatt-hour at the generator terminals divided by the heat units in

the fuel consumed to produce one kilowatt-hour—is, in actual practice, rarely higher than 20 per cent. Research is devoting special effort to improvement in this field, and some look to the vaporization of a combination of fluids instead of simply water.

Standardization

Effort is being made to standardize, within reasonably flexible limits, such apparatus or portions of apparatus as do not require to possess such variations as have hitherto existed. Take, for example, the standardizing of frequency for electric systems. We may expect that, profiting from the lessons of the past, where new lines of industrial activity are opened up, there will be an increased effort to conform to certain basic standards, thereby avoiding complexity and inefficiency such, for illustration, as are found in portions of the electric systems referred to below as existing in Greater London.

Action to Conserve and Efficiently Utilize Coal in United Kingdom by means of Central Stations

In the United Kingdom, the methods of mining and using coal have been the subject of an important and comprehensive investigation by the Coal Conservation Committee of the Ministry of Reconstruction. Its final report was issued in 1918.

The present coal consumption, *for power purposes*, in the United Kingdom is at least 80,000,000 tons. By proper co-ordinated and centralized systems of power production and distribution for the whole country, it is estimated that 55,000,000 tons of coal per annum might be saved and, in addition, the following important advantages would result:

A reduction in the cost of transport in carrying coal.

A possible saving in coal consumption for domestic purposes (the consumption for which purpose is now probably 35,000,000 tons per annum).

The reduction in the cost of coal handling involved in house-to-house delivery and general coal distribution.

The great advantages and economies which would result from the more extended use of electricity in the household for heating, cooking, and cleaning purposes, in the way of labour-saving devices, reduction of smoke, increased cleanliness, etc.

The possibility of utilizing the coal at present left in the pits or otherwise wasted.

The possibility of extracting by-products, etc., before consuming the coal for power purposes.

The increase in railway electrification, with its attendant advantages, which a comprehensive electric power supply system would render commercially possible and profitable.*

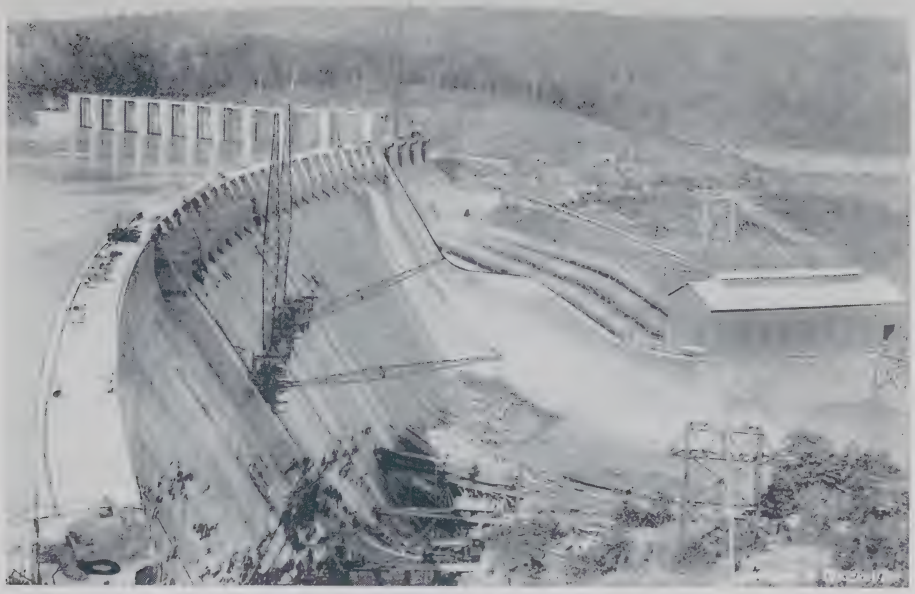
* See *Final Report*, Coal Conservation Committee of Ministry of Reconstruction, London, Eng., 1918.

All these savings and advantages, taken together, show a total possible national advantage which can hardly be put at less than £100,000,000 per annum, apart from the manufacturing and industrial advantages of a cheap and efficient electric power supply. The Reconstruction Committee lays special emphasis upon the part which power will play in the cost of manufacture and in the matter of international industrial competition, to which all countries are devoting such great attention. The economies resulting from the supplying of power to industry through the agency of the electric motor are everywhere recognized. In the munition factories erected during the war 95 per cent of the machinery was electrically driven. The Committee therefore points out that the problem is not so much how to apply power to tool or process as the case may be, but how best to generate and distribute the electric power required.

As some indication of the technical difficulties to be overcome in Great Britain, in Greater London alone there are 70 different authorities, 70 generating stations, with 49 systems of generation, 10 different frequencies, 24 different distribution voltages, and 70 methods of charging and prices. It is not surprising to learn that, under such conditions, the average size of unit is under 700 k.w., and the average size of station less than 6,000 k.w. In addition, there are 9 traction stations, used chiefly for supplying power to the rapid transport systems.

The Committee recommends that, instead of over 600 districts, as at present, Great Britain should be divided into some 16 districts, in each of which there should be one authority dealing with all the generation and the main distribution. For each district, there would be a standard frequency and voltage for the trunk mains, into which power stations situated at the most advantageous sites would feed, and into which could be fed also power derived from surplus gas or waste heat. Especial attention would be given to the development of power at the pit mouth, where coal, which it does not pay at present to bring to the surface, might economically be utilized. The main steam-power stations would be very large, probably 150,000 h.p. or over, with units of from 20,000 h.p. to 50,000 h.p. They would be constructed preferably outside the centres of population, in situations where ample area could be obtained to permit the erection of by-product recovery plants and, in some cases, the establishment of electro-chemical industries.

A bill to give effect to many of the recommendations of this committee is at present being considered by the British Government.



NARROWS DAM, YADKIN RIVER, BADIN, NORTH CAROLINA

With the exception of the Cheoah dam, this is the highest overflow dam in the world. Tallassee Power Co., a subsidiary of the Aluminum Co. of America. Maximum height, 216 feet; total length, 1,875 feet; length of spillway, 644 feet, maximum discharge of spillway, 100,000 second-feet; maximum discharge of bypass, 160,000 second-feet; total discharge capacity 260000, sec.-ft.



CHEOAH DAM, LITTLE TENNESSEE RIVER, NORTH CAROLINA—THE HIGHEST OVERFLOW DAM IN THE WORLD

Tallassee Power Co., a subsidiary of the Aluminum Co. of America. Maximum height, 225 feet; total length, 740 feet; length of spillway, 626 feet; maximum discharge, 160,000 second-feet; closure tunnel 20 x 20 feet; emergency tunnel, 30 x 30 feet, for passing floods.

Face p. 232.

United States Taking Action Respecting Central Steam Plants

Regarding the centralization of plants at or near the coal mines, L. H. Rittenhouse, chief of the Power Section, Production Bureau of the United States Fuel Administration, states:

"There are a number of large modern central station electric power plants installed in the various coal regions of this country. The purpose for which these were built was that of supplying electric energy to the coal mines for the purpose of operating their machinery in the production of coal. Among some of the more important of these plants may be mentioned: The Virginian Power Co., Charleston, West Virginia; The Logan County Light and Power Co., Logan, West Virginia; The Appalachian Power Co., Bluefield, West Virginia; The West Penn Power Co., Pittsburg, Pa.; and others.

"These companies have large turbo-generators, some up to 20,000-k.w. capacity, and, of course, are more economical than the many isolated plants at the various collieries which have been supplanted by these modern stations. As an investment proposition, they apparently pay the owners a good return, and most of those mentioned, as well as others, were in operation before the war. The Government encouraged the operation of, and additions to, these central power plants during the war through the activity of the Power Section of the Production Bureau. Not only was the conservation in coal recognized as a necessary and worth-while result, but the saving in labour and in iron and steel that was brought about by the operation of large units was recognized and full advantage taken in the planning of new and additional power facilities in the respective coal-fields. In other words, it was impossible for an individual coal operator to install a small or medium-size power plant if central station service was available. This policy was maintained through our co-operation with the Electrical and Power Equipment Section of the War Industries Board, which section had complete jurisdiction over all power-house apparatus."

Respecting the still broader question of conservation through the elimination of a great deal of the coal distribution by construction of power plants in the coal districts, the electric energy being transmitted to the various industrial centres of the country over high tension transmission lines, Mr. Rittenhouse continues:

"To a certain extent, this result is accomplished by the power stations referred to above, as they transmit at voltages up to 66,000 and over distances reaching 100 miles in some cases. However, these plants are primarily intended to supply the energy required in the coal mines themselves, and most of them are at too great a distance and of insufficient capacity to economically distribute power to large industrial centres along the eastern seaboard. It will only be a question of time, however, before large super-stations

will be constructed in some of the coal-fields, particularly those near the congested industrial sections in the east, and full advantage taken of the opportunity to burn the culm or refuse coal, together with the advantage of distribution at high voltage to industrial centres. The Government has fully recognized the desirability of the adoption of the above plan, in that there will be a saving in coal consumption, man-power, transportation, etc. Indeed, this very problem had been approached just previous to the signing of the armistice."*

Smoke Nuisance

While discussing the direct saving of coal, we should not overlook the important cognate subject of smoke nuisance. The Commission of Conservation has, at various times, drawn attention to the fact that smoke prevention ordinances should be strictly enforced. The present is an opportune time again to draw special attention to this subject.†

Due to the widespread employment of hydro-electric power in our factories, and to the very extensive use of anthracite coal for domestic purposes, the smoke problem has not previously been forced upon the attention of the Canadian public at large to the same extent as during this winter. The required substitution of much soft coal for anthracite, and the incomplete combustion due to apparatus and chimney flues not being best adapted for the consumption of soft coal, have resulted, at times, in charging city and town atmospheres with an amount of smoke not before observed in this country. In view of the fact that, in future, soft coal may have to be used to a greater extent, increased attention should be given to the installation and operation of efficient smoke-consuming devices. Steam locomotives contribute a great deal of smoke, which the use of electric locomotives within city boundaries would greatly lessen.

Before directing attention to the great savings in power and light which may be effected by the co-ordination and inter-connection of power plants and systems, we shall very briefly enumerate certain other efforts made to effect economies in other fields of power consumption.

Railway Electrification

The near future promises increasingly great development of hydro-electric power for use in the electrification of railways now using steam motive power. The Director-General of Railroads of the United States has stated that, if the Government were to continue the administration of the railways for any prolonged period, he would be in favour of resorting to the use of electricity just as far as it could practically be employed.

* Letter from U. S. Fuel Administration to A. V. White, December 30, 1918.
† See *Fourth Annual Report*, Commission of Conservation, Ottawa, pp. 189-205.

He stated that, probably, electrification would actually be undertaken while the Government controlled the railways and that the problem would be attacked at favourable points where water-power possibilities were most advantageous and where the cost of making the change from steam to electricity would be comparatively slight. The saving in cost of subsequent operation, he said, would be such a convincing demonstration, that electrification as a general policy would be demanded by public opinion.

In Canada there is much agitation for the creation of suburban electric lines and for the electrification of steam railways. The general railway situation, however, is in a transitional state, and it is not possible to predicate just where and what developments in electrification may take place in the near future.

Regain of Electricity

In connection with main-line electrification, there is the saving of power effected by the employment of re-generative control, *i.e.*, utilizing the weight of trains running down grade to generate electricity which is returned to the system.

The Skip-Stop System

In lieu of the old plan of having electric tram-cars stop on signal on any street corner, thus making from 12 to 14 stops per mile, railway companies have been induced to reduce the stops to not more than eight per mile in business districts, six per mile in residence districts, or four per mile in open country. By these means a saving of from 10 to 15 per cent in fuel has been effected, while, in addition, the time per trip of the cars is reduced without increase in speed. By way of illustration, the Connecticut Company has reported a saving of fuel of 10 per cent for its New Haven lines; other reports indicate saving at rates varying from 3,600 tons per year in Columbus, Ohio, to 21,000 tons per year in Detroit, Mich.

Staggered Hours of Closing

As a means of smoothing out the load curve, staggered hours for closing appear to offer great promise. A recent investigation made in Boston showed that at least 15,000 k.w. in generating capacity would be saved on the system of the Edison Electrical Illuminating Company if 30 industrial establishments would change their working hours by 30 minutes. Fifteen thousand kilowatts represents about one-sixth of the total estimated peak load of the Boston system for this winter. The comparatively small change in closing hours required to effect such a large increase in available capacity is very striking.*

* This statement was made at a recent meeting of the Boston section of the A.I.E.E., by Mr. L. L. Elden, electrical superintendent of the company. See *Electrical News* (Canada), January 1, 1919.

Restricted Possibilities of Electric Heating

For years past I have been emphasizing the comparatively limited use which can be made of electric energy as a wholesale substitute for coal for heating, including the heating of buildings. The sooner it is realized in Canada that hydro-electric energy, as a heating agent, can never be an adequate substitute for coal in Canada, the sooner will action be concentrated upon sources from which real relief may be derived. It is useless to entertain hope respecting a source whence no sufficient relief can be obtained. At our Annual Meeting in November, 1917, I stated that "The extent to which electric energy will be available for heating has been much overrated and, realizing the underlying physical limitations, one cannot be enthusiastic respecting the extent to which it may be utilized."*

During the past year, increased attention has been given to this subject, and the press, both technical and public, has referred to the matter in a manner which clearly shows that, at last, it is dawning upon the public mind that electric energy as a wholesale substitute for coal is a forlorn hope.† If it is to be used wholesale, then electrical

---

*Consult "Electricity Will not Replace Coal", by Arthur V. White, in *Industrial Canada*, Toronto April, 1918,; also, by same author, "Coal Problem of Canada Demands National Action—A Solution of a Vital National and Internationa Question" in the *Monetary Times Annual*, 4th Jan., 1918, pp. 25 *et seq.* See *Monetary Times*, 1st March, p. 18, also "Possibilities Ahead of the Gas Industry as Revealed by a Digest of Reports from Various Sources," by G. W. Allen in *Proceedings of 11th Annual Meeting of the Canadian Gas Association, 1918.*

The underlying principles governing in this electrical heating proposition are simple and may readily be understood by the general reader.

In order to determine what is technically termed the *mechanical equivalent of heat*, J. P. Joule, an Englishman, about 1850—and subsequently a number of other experimenters—ascertained the number of foot-pounds of energy required to raise one pound of water one degree Fahrenheit. In their simplest form, the experiments consist of confining a known quantity of water in an insulated vessel and transmitting to the water by means of agitated vanes—like a churn—the energy developed by a known weight falling through a given distance. Taking into consideration the result of various experiments, this equivalent may be taken at 778 foot-pounds. It may be stated, for example, that 778 pounds falling through one foot will develop energy sufficient to raise one pound of water one degree Fahrenheit. This heat unit is termed a British thermal unit, or B. T. U.

Now, by definition, a horsepower, is 33,000 foot-pounds per minute, or 33,000 x 60 foot-pounds per hour. If, therefore, we divide 33,000 x 60 by 778, we obtain 2,545 as the heat units derivable from one horse-power-hour of energy. Correspondingly, the heat units derivable from one kilowatt-hour are 3,412.

It makes no difference, of course, what prime agency has resulted in the development of the power. Consequently, it may be stated that *one horse-power hour of electrical energy only yields approximately 2,545 heat units. One pound of anthracite coal contains about 14,000 heat units.*

† The Hydro-Electric Power Commission of Ontario recently issued two valuable papers by A. S. L. Barnes, namely *Report of the Rate of Coal Consumption in Various Electric-Generating Stations and Industrial Establishments in Canada and the United States;* also, *Report on the Heating of Houses—Coal and Electricity Compared.* (The same discussion is published by the Honorary Advisory Council for Scientific and Industrial Research as *Bulletin No. 6.*) Consult also valuable article " Heating Our Homes with Electricity," in the *Electrical News*, Toronto, Feb. 1, 1919.

energy is more efficiently employed for power than for heating purposes. For many manufacturing processes requiring heat, and as an auxiliary heating agent for buildings, etc., electricity has a wide field of usefulness. Great economies in coal will be effected by a proper co-ordination of electricity, coal and gas, according to their respective spheres of greatest efficiency.

Growth of Co-ordination of Power Production

Greatly increased attention is being given to the subject of the inter-connection of various electric plants—whether steam-electric or hydro-electric, or combinations of both—with the object of securing greater efficiency in the supply of power and light to districts respectively served. The editor of the *Electrical World*, referring to this subject recently, stated that "Economic co-operation is going to be one of the key-notes of the reconstruction period, and, whether an engineer believes that interconnection will pay or not in a given case, he will do well to analyze its prospects."*

In the United States, the Fuel Administration commenced investigations in different sections of the country to ascertain the operating status of various power-producing companies, in order to determine how best to co-ordinate their activities to the end that coal might be conserved. Commenting in general terms upon these efforts, Mr. L. R. Clapp, chief of the States Conservation Bureau of the Federal Administration, writes:

" The inter-connection of power systems, both steam and hydro-electric, offers an opportunity for real fuel economy and has received the active attention of this bureau. In many parts of the country duplicate transmission systems exist, serving practically the same territory. One or more of such lines may derive all or nearly all of its power from water, while other companies use coal. No company operates with a continuous one hundred per cent load factor, and almost always the peaks are different for different companies. Therefore inter-connections permit the use of the maximum water-power, and also allow an increase in the average load factor. In its hydro-electric work the bureau has had the assistance of the Geological Survey, and much work of permanent value to the country has been effected along these lines. Another similar activity is the possibility of closing down an uneconomical central station where, in the same territory, a more efficient power plant is able to give the same service. It is estimated that there are, throughout the country, nearly 500 instances of such duplication, and several consolidations have been effected. The savings which have resulted from this work have been estimated to be some 540,000 tons of coal in the calendar year

* *Electrical World*, New York, Dec. 21, 1918.

1918. In general, we feel that this has not been a particularly profitable field for emergency conservation work, the projects involved requiring far too much time for their consummation for immediate benefit. Over a ten-year period, perhaps, important coal economies could be effected by this means."*

Heretofore, efforts have been concentrated in securing the efficiency of the unit apparatus of power-generating stations, such as turbines, generators, transformers, etc., but, now, efforts are being directed to increasing the efficiency, not only of units as such, but of the systems of which the units are an integral part. In this connection such questions as the load factors of generators and of systems, the diversity factor, etc., are being subjected to scientific analysis. The creation of super-power stations, suitably situated with respect to cheap and reliable supplies of coal, of water, of raw materials, for shipment and other purposes, will receive increasing attention. In connection with all these matters the greatest care should be taken not to disturb ruthlessly existing organizations and installations, but rather to seek out ways and means by which they may be adapted in some ready and efficient manner to the new general scheme.

Fuel Administration Efforts in New York

Let us now consider more particularly some of the definite lines of investigation being conducted by the United States Fuel Administration. First, it may be instanced that in the Capitol district in the state of New York, which comprises the general territory adjacent to Albany, Troy, and Schenectady, there have been in operation six prominent power companies, namely, the Adirondack Electric Power Corporation, Cohoes Power Co., Hudson Valley Railway Co., Municipal Gas Co., of Albany, General Electric Co., of Schenectady, and the General Electric Power Co., of Schaghticoke. The two-first named companies, the Adirondack Electric Power Corporation, with power plants at Spier Falls and at Mechanicville, on the Hudson river, and the Cohoes Power Co., with a plant on the Mohawk river at Cohoes, are essentially hydro-electric companies using steam stand-by plants. The Adirondack Company also purchases power from a plant owned by the Hudson Valley Railway Co., at Mechanicville, which plant burns birds-eye anthracite coal, and from the steam plant owned by the Municipal Gas Co., in Albany. The Adirondack Company is essentially the distributing company for the entire district, although each power company has operated within its own territory without much competition.

* From letter to A. V. White, January 3, 1919.

Under ordinary conditions, operating independently, the power companies used *all* the water available at their respective plants, and then depended upon steam-plants for additional power, although, at the same time, one or other of the companies often had surplus water available, due to the diversity factor of their requirements.

At the request of the Fuel Administration, a special study was made of the various companies' load factors, equipments, and prospective requirements. This study developed the fact that the companies operating under a master load despatcher could make use of a considerable amount of the water-power which would otherwise go to waste. This condition was due to the existence of the new Barge canal with its storage reservoirs.

The Cohoes Power Co., situated as it is at the mouth of the Cohoes river, could take advantage of all the surplus water in the Barge canal. Under ordinary operation, it did not make use of the entire surplus waters of the canal. However, as the company was inter-connected with the Adirondack Co., that is, the distributing company, it was possible to pump this surplus power, so to speak, into the lines of the Adirondack Co., and thus, in a large measure, dispense with the steam plants which they were using.

At the suggestion of the United States Fuel Administration, the companies arranged to co-ordinate their developments, and are now operating under a combined system, in which the Adirondack Electric Power Corporation acts as master load despatcher. This co-ordination has necessitated practically no additional expense for new equipment in order to effect this considerable saving in coal.

Fuel Administration Efforts in Pennsylvania

In Pennsylvania special investigation has been made with the object of encouraging the power plants of the state, by co-operation, to develop, as far as possible, steam-electric power at the mines, transmitting the power by electricity instead of in the form of fuel. Incidentally, the development of power at them ines frequently enables a grade of fuel to be used which it would not pay to mine and transport.

Reporting upon this subject, the State Fuel Administrator of Pennsylvania has stated that "the generating of from 200,000 to 250,000 kilowatts at the mines will result in a net saving of transporting 1,000,000 net tons of coal annually from the mines to industries. This saving in railroad transportation will be more than enough to pay for the investment in transmission lines. The transmission would thus fulfil two functions, either one of which independently would be more than sufficient to justify the investment

by the demand upon our manufacturing resources and man-power. The net result of the investigation seems to indicate the annual saving of 500,000 tons of coal and obviating transportation of 1,000,000 tons of coal."

Fuel Administration Efforts in New England States

Several companies in the New England states are considering a complete inter-connection of the plants in Eastern Massachusetts. The plan under consideration would probably save in the neighbourhood of 70,000 tons of coal per annum and release about 50,000 k.w. generating capacity. The matter is in the hands of a conference committee of central station interests. Representatives of the War Industries Board, the Massachusetts Gas and Electric Light Commission and the Conservation Division of the United States Fuel Administration, have been in conference with representatives of the central stations, and all are agreed that the plan could be made effective. It is estimated that, by inter-connection, the fuel consumption in the plants involved, about seventeen in number, would be reduced from an average of 2·38 pounds per k.w.h. to 1·93 pounds per k.w.h., representing a direct saving of 40,000 tons of coal. The plan does not involve the discontinuance of any of the generating plants composing the complete system. Each plant will be required to operate for a portion of each year, the most economical plants running more continually, the inefficient plants being used for peak-load requirements. The quantity of power involved is in the neighbourhood of 200,000 k.w.

Chicago, Milwaukee and St. Paul Ry. Electric System

One striking, if not the most striking, instance of the co-ordination of electric power plants is that effected by the Chicago Milwaukee and St. Paul Railway Co., for the electrification of some 440 miles of its railway. Here, twelve hydro-electric plants and four steam plants are co-ordinated so as to feed into the general transmission system.*

Co-ordination of Power Systems in Canada

The Hydro-Electric Power Commission of Ontario, in the extension of its various power installations, has also been seeking greater efficiency by interconnecting and co-ordinating several of its systems until, in effect, they form one comprehensive unit.

By way of illustration, interconnection has been arranged between the Wasdell Falls system, taking power from the Severn river, with a head of about 14 feet and an installation of 1,200 h.p.; the Orillia system, with development at Swift rapids, on the Severn

* For further description consult "Electrification of Railways," by S. T. Dodd, in *Ninth Annual Report*, Commission of Conservation, Ottawa.

river, under a head of about 50 feet, and with 5,000 h.p. installed; the Eugenia system, developing at Eugenia falls, on the Beaver river, under a head of 550 feet and with a machinery installation of 8,800 h.p.; and the Severn system, with development at Big chute on the Severn river, under a head of about 58 feet, with an installation of 5,600 h.p. The steam plant at Owen Sound has been kept in commission, and, at times, is used to help on the Eugenia system, and the steam plant at the Canadian Pacific elevator at Port McNicoll is correspondingly used on the Severn system.

It is under consideration to have the Muskoka system also co-ordinated to this group. This plant is situated at South falls, on the South branch of the Muskoka river, under a head of 106 feet, with installed capacity of 1,750 h.p. and a possible capacity of about 6,000 h.p.

The Commission has also proposed a new development at Port Elgin, on the Saugeen river, under a head of 80 feet, with an estimated complete development of from 10,000 to 15,000 h.p. This, when constructed, will supply some twelve to fifteen municipalities which, at present, are utilizing coal for the production of light and power.

It may be explained that, at the Muskoka and proposed Saugeen developments, largely increased power may be obtained at times of flood flow. The Eugenia plant, on the other hand, is essentially a storage proposition, and can, therefore, at times of flood flow impound waters which, subsequently, can be released in order to augment shortage of power resulting from low-water conditions at, say, the Muskoka or Saugeen plants.

In the above districts we find the feasibility of co-ordinating at least six hydro-electric plants and two steam-electric plants. In addition, if future requirements so warrant, it is contemplated to install frequency changers, so that the Niagara system of the Commission, the transmission lines of which run close to the systems above referred to, may also be brought into parallel with them.*

From the foregoing illustrations we perceive how widespread is the movement to attain the efficiency possible by intelligent co-ordination and, also, how diverse are the basic factors admitting of combination. No doubt, in future, more than in the past, those

* For valuable résumé of activities of the Commission, consult "Electric Power Generation in Ontario on Systems of Hydro-Electric Power Commission," by Arthur H. Hull, in *Proceedings of American Institute of Electrical Engineers*, January 1, 1919.

installing new electric systems, or remodelling older systems, will ensure that designs are adopted which will facilitate taking advantage of the benefits resulting from possible paralleling with other systems.

Conclusion

The burden of many of the above comments and illustrations is this: On the principle that a 'penny saved is a penny made,' there should be careful investigation of some of the outstanding typical conditions under which coal is being consumed in Canada, whether in the home, in the institution, in the office building, in the small manufactory or in the larger industrial plants. If authorities, for example, find through the enforced utilization of insulation upon steam piping, heaters, etc., or by the shutting down of uneconomical plants, or the substitution of efficient for inefficient apparatus, or the repair of apparatus, or in other ways, that very substantial savings of coal may be effected, then such economies, according to some reasonable scheme of administration, should be made compulsory in Canada. It is not the intention here to suggest any unreasonable procedure in connection with these matters. Certain economies, involving radical changes, may not be made fully effective except over, possibly, a five-year or a ten-year period. In other instances, however, substantial economies can immediately be effected to the benefit of the coal consumer, to the transporter and to the country as a whole. These, then, should receive prompt and best attention. Why, for example, should Canada be compelled, especially under conditions of coal shortage, to provide for the obtaining and transportation year after year of, say, ten tons of coal per annum to a certain consumer, if, through the wise expenditure of a few extra dollars, either in initial outlay for better apparatus or by effecting certain changes in existing equipment, the individual would only require seven or eight tons? The days for the widespread use of anthracite coal are numbered. Doubtless, in relatively few years, its use will be authoritatively restricted. Bituminous coals and lignites will be subjected to by-product and other manufacturing processes with the object of producing a satisfactory and clean-burning fuel. Canada cannot and must not ignore the march of progress in these fuel problems, nor in effecting economies by the prevention of needless fuel and power wastes.

The Power Situation in Canada

BY

LEO G. DENIS

Hydro-Electric Engineer, Commission of Conservation

AS early as 1912 the Commission advocated the desirability of a power survey for the Dominion. Owing to unavoidable delays, however, this was only undertaken much later; and the first part of this survey, relating to electric generation, has just been completed. Probably the importance of adequate power supply has been the most striking revelation of the war to many interested in the industrial development of the Dominion. True, our agriculture, forests and even mining resources may have played a larger part, but the importance of these had long been realized, while the sudden demand on our power resources was a most effective agent in making those still in doubt fully appreciate their immense value.

The estimated amount of power in use all over the world is some 120,000,000 h.p., of which only 15,000,000 h.p. is hydraulic. Of the total, 62 per cent is used for industrial purposes, 20 per cent for shipping, and 18 per cent for railways. The portion used for industry is divided: 13,000,000 h.p. for the United Kingdom, 24,000,000 h.p. for Continental Europe, 29,000,000 h.p. for the United States, 6,000,000 h.p. for the British Dominions and 3,000,000 h.p. for Asia and South America.

The increase in war demand for electric power was more rapid and greater than any peace-time records since the commencement of the industry. Never had the industry failed to anticipate business development by at least a year in advance. To further add to the difficulties, power organizations were confronted by the fact that apparatus was scarce and carried an oppressive but inevitable war-time cost.

That Canada is a large user of electricity is well brought out in a comparison of the consumption per head of various cities, given in a recent paper by J. M. Robertson.* New York uses 225 k.w.h. per head yearly; Boston, 350 k.w.h.; Cleveland, 400 k.w.h.; Pittsburg, 500 k.w.h.; Buffalo, 586 k.w.h.; while, in Canada, Toronto uses

**The Journal of the Engineering Institute of Canada*, May, 1918.

700 k.w.h.; Montreal, 783 k.w.h.; and, for the whole province of Quebec, it is said to be about 700 k.w.h. per head.

Canada has become renowned for its water-powers, and the wide expansion which may be anticipated along these lines should be most carefully guided. Water-powers will be used to supply large and small communities with the necessary light, power and heat to ensure proper domestic and industrial development. The larger portion, however, will be required to supply such loads as grinding of wood-pulp, large continuously-operated industrial plants, electro-chemical and metallurgical industries, particularly for the operation of electric furnaces.

The British Conjoint Board of Scientific Societies report states that: "To enable the Empire to recover, with any degree of rapidity, from the financial burden imposed by the war, it will be necessary to develop, in a much greater degree than heretofore, its latent resources, and it must be realized that, without an ample supply of cheap energy, much of this wealth must always remain latent." In its main conclusions the same report urges the British Government to bring to the attention of the overseas Governments the necessity for a closer systematic investigation of all reasonably promising water-powers and of their economic possibilities. Like our report on the *Water Powers of Canada*, 1911, it stresses the fact that, to develop the most obvious power site on a river without full investigation of the whole power reach of the river, may not secure, and may make it impossible to secure, the maximum advantageous use of the river by the development of two or more sites. Therefore, these investigations should be made by the Government, rather than by private interests, especially where water conservation by storage is contemplated.

In pre-war days, France was accredited with 750,000 h.p. of developed water-power; since the outbreak of war, 850,000 h.p. has been added under government auspices. Of the total utilized, some 542,000 h.p. is used for electro-chemistry and metallurgy. On three Alpine streams alone she has increased her hydro-electric power to the extent of 180,500 h.p. since 1914. Although these have been developed mainly for war purposes, it is predicted that they will now be of material assistance in the production of matter and material formerly monopolized by Germany.

In 1910, 28 per cent of the area of the German Empire was served by electrical networks, while to-day over 74 per cent of the same territory is thus served, with plans to increase it to 92 per cent.

In the smaller states of the Empire, electrical development has been left to private enterprise, but in the larger ones, the state plays a more prominent part.

Previous to the armistice, the Central powers were carefully revising legislation to ensure more adequate power supply. The various steps taken comprised state participation in the consolidation and administration of central stations; in certain states this also included transmission lines and left the distribution to municipalities. District committees were to be appointed to prepare and carry out systematic schemes. In other areas, the use of water-power for a uniform and economical supply of electricity is being promoted, through financial aid by the state, with rate control and state participation in profits.

That we cannot be too careful in the development of our power resources is exemplified in the United States, regarding which Dr. C. P. Steinmetz,* after careful estimates, reveals most alarming figures in connection with prospective substitution of hydraulic energy for coal. The maximum possible hydraulic energy, calculated from rainfall and elevation data, is placed at 230,000,000 k.w. This maximum figure represents only a little more than the total energy now produced from coal, and is *only about equal to the present total energy consumption of the United States*, including all forms of energy. Dr. Steinmetz adds that, in face of this, the hopes that, when coal once begins to fail, the United States may use the water-powers of the country as the source of energy, is and must remain a dream, because, even if all the potential water-powers of their country were now developed, and every rain drop used, it could not supply their present energy demand.

The importance of studying power conditions is also strongly felt in the United States, where engineering institutions advise proper ways and means which would naturally broaden out to studies and reports on policies affecting economics of power generation for general power application, steam electrification and special industries requiring continuous use of power. These organizations rightly believe that such a study and the recommendations resulting therefrom would be of immense value to the industries in shaping their policies in the generation and utilization of power.

---

* See *Proceedings, American Institute of Electrical Engineers*, June, 1918.

Existing Conditions in Canada

Taking Canada as a whole, the power situation is very complex. While conditions in this respect are fairly uniform and similar within each of our various provinces, we encounter marked differences, either under one aspect or another, when one province is compared with another. Possibly the only feature common to all is the marked increase in the demand for additional power.

Proper action with regard to the power situation of any country can only be intelligently determined by first becoming thoroughly cognizant of existing conditions. A more or less haphazard method should not be employed; in this manner attention is only given to special cases, usually brought to our notice by individuals or organizations. The prime object of such cases is often restricted to purely private interest, and there is great danger of ignoring the more pressing necessities of the larger problems. Realizing the important part which power was destined to play in Canada, the Commission of Conservation, as early as 1912, advocated a power survey of the Dominion, with a view to the study of prevailing conditions, and, where improvement could be effected, suggesting remedial measures or future policy. Thus far, it has only been possible to conduct this power survey in a thorough manner for the most important of our power-using industries, namely, electric generation. While the facts and conclusions presented in this report are mainly based on the results of this partial survey, other sources of information, such as the revised list of developed water-powers now being compiled, were also used, together with the study of conditions in other countries.

Canada is undoubtedly one of the richest countries in the world in both water-powers and coal, the two principal power-producing alternatives. These two resources, however, involve certain special problems, which must be solved in order to obtain maximum results through co-ordination.

Coal in Canada is mainly found in the extreme east and in the three most westerly provinces, with the natural result that the coal used between these points has either to be transported over long distances or imported from the United States. It is, therefore, essential that we realize the extent of our dependence on our water-powers, and the urgent necessity of their most advantageous development, thus permitting of a decrease in the amount of coal purchased from abroad.

The power conditions throughout the Dominion may be summarized briefly, from figures at our disposal.

Maritime Provinces

In the extreme east, with the abundant coal-fields of eastern Nova Scotia, practically all power is steam-generated. There are also two or three examples of long distance transmission of steam-generated electric energy in the Sydney and Amherst districts. Power at Halifax is also almost entirely steam-generated, although, according to a recent report by G. E. Booker,* there are, within a radius of 50 miles from this city, eleven streams capable of developing a total of some 17,000 h.p., some of which it is expected will soon be utilized. In south-western Nova Scotia power is principally hydraulic, including many municipal hydro-electric plants; the larger developments, however, are for pulp and lumber mills.

In Prince Edward Island, hydraulic, steam, and gas power are fairly evenly divided; large centres use gas and steam, and the hydro-electric developments, while comparatively numerous, are of smaller capacity.

New Brunswick has the three kinds of prime-movers for electric generation interspersed throughout the province. We find steam used mostly in the large centres, with a few hydro-electric plants of fair size; there are also many small hydraulic saw-mill and grist-mill developments. In view of the abundant hydraulic resources of the province, it may be expected that, eventually, water-power will, to a great extent, replace other prime-movers.

Ontario and Quebec

In Quebec and Ontario, power conditions are similar in many respects. Water-power is much the most important source of power. Quebec has its St. Lawrence and St. Maurice River developments; Ontario has its Niagara and Trent Valley powers, while many other important developments are found scattered throughout both provinces. Much industrial motive power is electric energy from hydro-electric plants. For electric generation, steam is largely confined to a few auxiliary plants operating under special conditions. The main difference between the two provinces lies in the ownership of the electric plants and systems upon which communities and industries are dependent for the necessary power. Practically all important electric systems in Quebec are privately owned, while the activities of the Ontario Hydro-Electric Power Commission have brought almost every electric system in this province either under public control or in direct competition with a public organization. Much has been said for and against public ownership, as compared with private ownership, of electric

* See *Electrical News*, Toronto, Sept. 15, 1918.

power systems. Public systems should be operated on strictly business principles, with competent technical heads exercising proper authority and free from aldermanic or other political interference. Private organizations must have adequate government control of certain phases of operation, such as rates, extensions, ownership of power sites, etc. Typical examples of the two kinds of ownerships are furnished by the two largest systems in Canada: the Niagara system of the Ontario Hydro-Electric Power Commission, and the privately-owned system of the Shawinigan Water and Power Company in Quebec, each having a total load of over 200,000 h.p. Future electric extensions in these two provinces will naturally be also through hydraulic developments; a 300,000-h.p. plant is now in course of construction at Niagara, while, according to a recent estimate by Mr. A. V. White, Canada's share of the St. Lawrence River water-powers, which are practically all accessible to Montreal, amounts to some 1,800,000 h.p., 24-hour power at low water. Based upon the amount of electric energy used in Toronto at the present time, 1,800,000 electrical h.p. should suffice for the needs of a population of 7,250,000.

Prairie Provinces

In Manitoba, electric energy for the Winnipeg district is supplied from the abundant water-powers of the Winnipeg river,. The other power sites on this river are also within transmission distance. West of Winnipeg, however, with minor exceptions, all power is either steam- gas- or oil-generated, with the first mentioned predominating.

In Saskatchewan and eastern Alberta, power conditions resemble very closely those of western Manitoba. The almost total absence of water-powers in the southern portion of this section of Canada has made it necessary to use fuel-consuming prime-movers for power production. For electric generation, the larger centres use steam, some plants having very efficient turbine equipment, while the less important centres have small internal combustion engine plants. The small plants are either internal combustion or steam. They are usually very expensive to operate, with the result that either high rates are charged or the plant is operated at a loss. This prevents extension of power facilities for both domestic and industrial purposes.

Western Alberta, with abundant coal resources, uses practically only steam-generated power; a notable exception, however, is the Calgary district, with two fairly large hydro-electric developments on the Bow river, situated a short distance west of Calgary, power being transmitted to that city.

British Columbia British Columbia has vast hydraulic resources, together with an abundant supply of coal, and electric energy is generated both from steam and water-power, the latter largely predominating. Low costs and low freight rates, due to water transportation from the California oil-fields, have induced the construction of a small number of oil-consuming plants. Large hydro-electric plants are found in the interior, but are particularly in evidence in the coast district, including Vancouver island, where water-power development is particularly attractive, owing to the heavy precipitation and to the high heads made possible by natural conditions. Water-power developments of from 5,000 to 20,000 h.p. are quite numerous, and are utilized for electric energy supply and for such industries as pulp and paper, mining and lumber. As proof of attractive hydraulic development, we have the unusual instance of some coal mines being operated by hydro-electric energy.

Central Plants Considering the entire Dominion, while total figures regarding prime-movers are only accessible for electric central station plants, the Commission of Conservation survey gives a fair idea of the power situation. This information shows a total of 565 electric central station plants in Canada, with an aggregate capacity of 2,107,743 h.p. If we group the plants according to the kinds of prime-movers*, we find:

270 Hydro-electric plants, aggregating.....	1,806,618 h.p.
201 Steam plants, aggregating.....	288,202 h.p.
49 Gas† plants, aggregating.....	8,157 h.p.
45 Oil or gasolene engine plants, aggregating..	4,766 h.p.
	2,107,743 h.p.

Problems Requiring Attention While, on the whole, the power situation in Canada is fairly satisfactory, there are numerous problems which require authoritative consideration and action; moreover, numerous faulty existing conditions could be much improved by following proper technical advice. One or two of the latter instances may be briefly referred to here.

Small Plants Inefficient Although the great bulk of our power is obtained from large, up-to-date plants, where conditions are efficient and satisfactory, there are many small plants, both water-power and steam, where conditions fall far short of what they should be. Small, inefficient steam-plants should be eliminated

* Thus, if a company normally generated electric energy in a water-power plant, it would be listed as a " hydro-electric " installation. If this company also had an auxiliary steam plant, say as an auxiliary, the latter would be listed as a " steam " plant.

† Practically all producer-gas engine plants.

and replaced as far as possible by electric energy. Small water-power plants offer a different aspect; they each possess inherent energy which, if not fully utilized, is lost to the community. Individually, they may not seem important, but, in the aggregate, the loss is considerable. In eastern Canada alone, including Ontario, Quebec and the Maritime Provinces, there are no less than some 1,025 water-power plants of 200 h.p. and under; moreover, these are practically all situated in the more thickly populated portions of the provinces where power is most valuable. In many instances, greater efficiency might be obtained from these plants, each site furnishing an individual problem and involving a study to ascertain what may be accomplished in the way of betterment of operating conditions. Elsewhere, we have had demonstrations that such betterment is, in many instances, easily attainable.

Among the many improvements which can increase the efficiency and output of a small plant are: Increase of head and pondage; repairing or replacing leaky dams, works, conduits, etc.; scraping and cleaning water-wheel runners; cleaning out or deepening tailrace; replacing or re-aligning all bearings to reduce friction; eliminating all counter-shafts, belting and gearing, replacing same by direct drive.

In connection with the proposed improvement of water-power plants recommended by the Legislature of Massachusetts, the consulting engineer states that the average efficiency of the wheels at present in use, most of which were installed some time ago, is probably about 65 per cent. The advance in the art of hydraulic turbine design and installation in the last decade has been very marked, and efficiencies of 85 to 90 per cent are now attainable, which means that an additional 20 to 25 per cent of the total power can be utilized, and that the power obtained with the same amount of water when used inefficiently can be increased by from 30 to 38 per cent.

An example of the great benefit obtained by overhauling medium sized plants was recently noted in the province of Quebec. A municipality which had two hydro-electric plants, with a total capacity of 2,900 h.p., prior to reconstruction, increased the capacity of one plant by 50 per cent and the other by 127 per cent. Among the various changes made were the replacing of too small and inefficient turbines in one place, turbines of old design and inefficient in another, replacing a wasteful crib dam by one of concrete and reducing transmission line losses.

Power Supply for Middle West

Another question worthy of attention is that of adequate electric supply for Saskatchewan and adjacent portions of Manitoba and Alberta. The southern portion of this section of Canada is practically destitute of water-powers, and, thus far, the supply of electric energy has been largely restricted to the principal centres. Electric energy should be available in community centres for both domestic and local industrial purposes, to facilitate the promotion of such industries as go hand-in-hand with agricultural development. The present need and the requirements of the near future seem to indicate the desirability of comprehensive systems supplied from proportionately large steam-turbine plants. After a detail study of the demand at the present time and in the near future, a fairly definite plan should be worked out along the lines just mentioned. The installation should be developed to meet the demands of the market and should be developed with a view to interconnecting the various systems later on. Although the actual present demand may make this appear a rather optimistic suggestion, there is no doubt that our Middle West will continue to develop with increasing rapidity, and we should be prepared to deal with the situation should it arise. The great economy of interconnected electric systems is becoming more and more apparent, and, while some of the examples given involve very large undertakings, they serve to illustrate the point. Some of the advantages of interconnection are: Improvement in load factor, increased reliability of service, reduction of the necessary reserve machinery, and the net result is to improve the efficiency of the system. *Electrical World* of July 27, 1918, states that interconnection of energy supply systems is a matter of economic importance. It is one of the first steps towards increasing territorial load factors, and thus realizing the utmost reserve capacity in existing plants. Nor is it necessary to wait for the perfection of an elaborate plan before making a beginning. The same journal of Sept. 14, 1918, further states that the advantages of an interconnected system over a number of small plants operating independently are readily appreciated. It cites, as a striking example, a portion of the state of Wisconsin, where on account of the greater diversity factor permitting increased peak loads, the total daily output of a plant has been increased to three times what it was before interconnection.

In the United States, just previous to the armistice, every effort was made to obtain additional electric power, and, in practically every case, interchange of energy or interconnection of systems was given precedence over all other means.

As a solution for more power with less coal, several companies in the New England States have planned interconnections which, it is estimated, would save 70,000 tons of coal yearly and increase the generating capacity by about 50,000 k.w. The 17 plants involved represent 200,000 k.w. total capacity, while the coal consumption would be reduced from 2·38 lbs. per k.w.h. to 1·93 lbs. per k.w.h.

With regard to greater economies in power production, the Ministry of Reconstruction for Great Britain recommended the grouping of some 600 smaller systems into 16 districts, each to be supplied from large super-power plants replacing existing inefficient plants, and capable of supplying a comprehensive electric power distribution system.

The Electric Power and Supply Committee of the British Board of Trade has recommended that existing systems generating electricity separately for small areas be abolished and that the United Kingdom be divided into districts for the economical supply of electricity.

A committee has been formed in connection with the proposed electric supply of the devastated regions of France and, as, in most cases, all apparatus previously operated has been destroyed, it will so plan the reconstruction that the many small plants will now be replaced by fewer large generating systems.

Water Storage Reservoirs

One other question should probably be mentioned: that of water conservation storage reservoirs in connection with the full utilization of our water-power resources. The Commission of Conservation has always taken a particular interest in this aspect of power development, and it is gratifying to note the rapid advance made during recent years in Canada. Of our hydro-electric developments alone, 59 plants report the successful operation of this method of providing for increased flow at low-water periods. Many difficulties encountered in the early years in connection with efficient operation seem to have been overcome by careful observation and study of conditions from year to year. By carefully regulating its release from conservation reservoirs, water is successfully conveyed over long distances to the power plant with a minimum of loss. Both federal and provincial governments are doing excellent work, while numerous smaller private undertakings are also in evidence, and government encouragement and help, wherever economically feasible, cannot be too strongly advocated.

Another point, closely allied to water-flow regulation, is that of co-ordination in the operation of hydraulic plants, situated at short distances from each other on the same river, so as to avoid interference. It will soon become a serious problem in connection with the full production of our water-power plants. So far, possibly only one or two of the most advantageous water-power sites have been developed and utilized on each of our various rivers, and, even including our largest streams, these sites were far enough apart or had intervening compensating basins so that irregular operation would not interfere. The increasing number of sites utilized on each river is bringing them closer together, and when the plants are not operated directly by the same interests only strict and well defined regulation will avoid litigation and inefficient use of the full possibilities. It is apparent that such regulations should immediately be put into force in all provinces, thus ensuring the co-ordinate operation of water-power plants situated at different elevations on the same river.

Dr. Bryce: The two papers which we have just heard are unquestionably of great interest. Coming down on the Transcontinental last year, I could not help being impressed with the immense amount of power that is stored up in our rivers. I am much interested in the remarks which have been made by the last two speakers, particularly those with regard to the possibilities of saving through the use of electric power.

The Commission then adjourned, to meet on Tuesday and Wednesday following as a Conference on the Conservation of Wild Life called by the Commission of Conservation and the Advisory Board on Wild Life Protection, at which were presents members of the Commission, and representatives of the Dominion and Provincial Governments, of game protection and sporting clubs, fur dealers, and others interested in the conservation and protection of wild life.

Index

PAGE

ABITIBI district, fire ranging system in 26
Abitibi Power and Pulp Co 32, 160
Ackerman, F. L 95
Adams, Dr. Frank D., absence of 4
Adams, Thomas 16, 116, 119, 122, 125, 206
  advises *re* Kipawa 110
  consulted, *re* improvement plans 19
  paper by 95
  report by 56
  services of, *re* Halifax disaster 18
Addison, Dr., quoted 17
Adirondack Electric Power Corporation 238
Advisory Board on Wild Life Protection 53, 54, 253
  conference called by 54
  opposes relaxation of game laws 54
Aerial photography, feasible 149
  for forest survey work 29
Aeronautical Inspection Dept 186
Aeronautical Supplies, Director of Dept. of 185
Aeroplane fire patrol 149
Aeroplane lumber, best from old trees 34
  production of 33, 185
Agricultural College, Truro, forestry co-operation with 25, 161
Agriculture, Dominion Dept. of 153
  Illustration farms transferred to 14
Agriculture, Minister of, relation of, to Commission of Conservation 3
Agriculture, Ontario Dept. of 137
  school fairs under 138
Aircraft for forestry work 29, 149
Aircraft Production, Acting Director of 88
Aircraft Production Board of Great Britain 186
Air Service, National, establishment of 162
Alabama, bauxite found in 68
Alaska, orders for Sitka spruce placed in 185
  reindeer from 54
Alberta, forest fire legislation of 147
  increased shipments of coal from 42
  mining laws of 47
  oil prospects in 46
  power conditions in 248
  Prairie Fire Ordinance of 162
  prevalence of goitre in 22
  progress under Town Planning Act in 101
  proposed town-planning schemes for cities of 113
  Provincial Board of Health of, action of, *re* goitre 22
  revision of fire legislation in 27
Algonquin park, wood fuel from 152
Alliance Power Co., Edmonton, quoted 46
Alpine streams, power on, developed in France 244
Alumina, imports of 62
Aluminium, annual production of 57
  cost of production of 59
  electric energy required in production of 60
  exports of 62
  French Ministry of Munitions fixes price of 63
  history of industry 57
  industry in United States 57
  necessity of increasing supply of 89
  occurrence of 58

PAGE

Aluminium—*Continued.*
plants in Italy ... 61
production of, in Canada and United States ... 39
production of, in Italy ... 64
total production of, by countries ... 61
used in transmission lines ... 66
value and prices of ... 65
Aluminium Corporation, Ltd., referred to ... 60
plant of, in Great Britain ... 63
Aluminium Industrie Akliengesellschaft of Switzerland and Austria ... 61
plants of ... 63
Aluminum Company of America ... 37, 38, 61, 82, 88
capitalization of ... 63, 67
plants of ... 62
power necessary for ... 72
American Cyanamid Co., large consumer of power ... 225
American (Niagara) fall, cascade of ... 224
discharge of ... 223
American Institute of Architects ... 95
Anchor ice reduces power on St. Lawrence ... 38
Andrews, Prof. F. W ... 197
Anthracite coal, Canada's supply of, reduced ... 49
substitute for, necessary ... 48
Appalachian Power Co., power plant of ... 233
Arendal, Norway, aluminium plant at ... 64
Arkansas, bauxite found in ... 68
Arsenault, Hon. A. E ... 1
Ashburton, Lord ... 78
Ashburton Treaty ... 37, 38, 73, 77, 84, 86, 88, 89
rights under ... 83
Asia, power used by ... 243
Assistant to Chairman, report of ... 215
Atlantic City, meeting of International Joint Commission at ... 77, 87, 88
Austria-Hungary, aluminium production of ... 61, 64
Auzat, France, aluminium factory at ... 63

BABCOCK, J. P., illness of ... 4, 10
statement *re* salmon by ... 10
Bacteriology, advances in ... 20
Badin, N. C., aluminium plant at ... 62
aluminium production at ... 39
Baillie, Sir Frank ... 185
Baldwin, Pte. P. M., military service of ... 15
Balsam, future yield of ... 174
predominance of ... 166
reproduction of ... 181
Barley, results secured in planting of ... 134, 135, 136
Barnhart island ... 73, 88
Bartlett, J. P., quoted ... 67
Bauxite, imports of ... 62
production of ... 58
production of, in Italy ... 59
Bayne, J. N ... 116, 117, 118
Beaver river, Ont., power development on ... 241
Beaver Wood-Fibre Co., power requirements of ... 225
Béland, Hon. Dr. H. S ... 4, 14, 15
Belleville, Ont., town planning and housing at ... 19, 100
Benefits to health due to war ... 20
Berthierville, Que., forest nursery at ... 31
Big Eddy conservation dam, Ont ... 37
Bird rocks, Que., a bird sanctuary ... 53
Blumer, J. C ... 31, 157
Boards of Health, antiquated system of ... 195
Bonaventure island, Que., a bird sanctuary ... 53

PAGE
Booker, G. E., quoted 247
Borden, Sir Robert, on settlement of Long Sault development 84
Boston, conference at 104
consumption of electricity per head in 243
investigation of staggered hours of closing in 235
Boston News Bureau, quoted 63
Boudreau, Rodolphe 71, 94, 124, 125, 126, 132
Boulé River valley, Que., growth studies in 165
Boundary Waters Treaty 36
allotment of Niagara water under 218, 223
Bradt, E. P., *Handbook for Farmers* by 56
Bridle, Augustus, appreciation of Sir Clifford Sifton by 12
British Aluminium Co 61, 63
British army, experience of, with inoculation 196
British Columbia, aeroplane spruce lumber in 158
amount of Sitka spruce in 186
amount of timber burned in 177
annual lumber cut of 23
control of cutting operations in 162
co-operation in establishing laboratory by Government of 190
copper production of 43
Dept. of Aeronautical Supplies in 186
difficulty of securing Sitka spruce in 185
educational campaign by Forest Branch of 156
Fire Prevention League established in 51
forest efforts in 29
forest protection in 148
forest rangers of, under Civil Service regulations 27
forest report on Coast of 186
forest survey of 11
hydro-electric plants in 249
lumber cut of 140
mining laws of 47
orders for Sitka spruce placed in 185
order in council *re* Sitka spruce in 188
power conditions of 249
prevalence of goitre in 22
protection of forests from importation of white pine blister rust 30
saw-mill capacity of northern 33
slash disposal in 156
supervision of cutting operations in 146
timber resources of, over-estimated 6
timber sales policy of 142
Town Planning Act required in 102
University of 148
use of oil as fuel in 249
white pine blister rust not found in 153
without town planning legislation 18, 98
wood products laboratory established in 29
British Columbia Forest Branch 161
flying boats used by 149
British Columbia Sugar Refinery uses pulverized coal 48
British Conjoint Board of Scientific Research, report of 244
British Dominions, power used by 243
British Empire, output of petroleum in 45
British Government provides for afforestation 23
British Guiana, bauxite discovered in 58
British Isles, venereal disease contracted by Canadian soldiers in 202
British Medical Research Council, work of 20
Brown, Hon. G. W., resolution *re* death of 9
Brown, L. L., superintendent of forest laboratory 190
Bryce, Dr. George 1, 8, 9, 217, 253
Bryce, Dr. Peter H 56
Buffalo, N.Y., consumption of electricity per head in 243

PAGE

Building scheme, form of approval of ... 132
Building sites, acquisition of ... 128
planning of ... 128
Buildings, height and type of ... 131
Bullock, Prof. W. ... 197
Bureau of Municipal Affairs, Ontario ... 100
Burrell, Hon. Martin ... 1
Business methods in farming ... 137
Butte City, Cal., transmission line to ... 69
Butte, Mont., transmission lines to ... 69

CABINET Committee on Housing, constitution of ... 124
Calgary, assessment problems of ... 101
conference at, *re* assessment ... 19
hydro-electric power conditions in ... 248
scheme for assessment suggested for ... 114
town-planning scheme for ... 113
Calumet-Sag portion of Chicago Drainage canal ... 219, 220
Calypso, France, aluminium factory at ... 63
Campbell, F. J., quoted ... 24
Canada, a large user of electricity ... 243
aluminium, production of, in ... 64
aluminium transmission lines in ... 70
coal imports of ... 228
co-ordination of power systems in ... 240
diameter system of cutting in effect in ... 160
export lumber trade of ... 141
forest revenues of Eastern ... 176
fuel supply of Western ... 42
general approval of housing scheme in ... 103
must husband resources ... 14
no change in boundary waters without authority of ... 80
no commercial ores of aluminium found in ... 58
power plants in Eastern ... 61
power situation in ... 246
position of, *re* St. Lawrence development ... 91
prime-movers for power production in ... 249
ready to proceed with joint development of St. Lawrence ... 83
reduction in coal consumption in ... 228
settlers cutting wood-pulp in Eastern ... 157
should place embargo on currant and gooseberry bushes ... 154
statement of, in response to St. Lawrence Power Co.'s application ... 88
suggests joint development of St. Lawrence powers ... 93
terms proposed by, for joint development at Long Sault ... 74
transportation difficulties of ... 6
venereal diseases contracted by soldiers in ... 202
war work of medical men of ... 192
water allotted to, at Niagara Falls ... 36
Canada, position of Government of, regarding St. Lawrence power ... 37, 72, 74, 77
Canada's resources, directory of ... 6
Canadian Aeroplanes, Ltd ... 185
Canadian Forestry Association ... 152, 215
Canadian Forestry Corps, operations of ... 23, 140
Canadian National Railways system ... 151
Canadian Niagara Power Co., absorption of ... 221
Canadian Northern Ry., absorbed by Canadian Government system ... 30
Canadian Pacific Ry. elevator at Port McNicoll ... 241
Canadian Pacific railway ... 110
Canadian Press supports conservation ... 55
Canadian soldiers, prevalence of venereal diseases among ... 202
Carbocoal, development of ... 48
Carbonization Committee of Great Britain, recommendation of ... 46
Cardonnes, France, aluminium plant at ... 63
Carroll, Pte. James, death of ... 15

PAGE

Cauchon, Noulan 100
Cement Co. of Canada uses pulverized coal 48
Central electric plants 41
Central power plants 249
Central stations in United Kingdom 231
Cerebro-spinal fever 197
Chandler, Prof. B. A. 159, 160
Chatham, Ont., town planning and housing at 19, 100
Chedde, France, aluminium factory at 63
Chico, Cal., transmission line to 69
Chicago and Western Indiana Ry., substitutes electric power 230
Chicago Drainage canal 218
Chicago, increased diversion of water at 39
  power economies in 230
Chicago, Milwaukee and St. Paul Ry. electric system 240
Chippawa-Queenston power development 36, 220
Choquette, Mgr. C. P. 1
Christie, Arthur, report by 136
Chronic diseases, due to teeth 21
City Planning, National Conference on 104
Civic Improvement Leagues, local 121
Civic Improvement League of Canada 116
  meeting of 102
  resolutions of 121
Clapp, L. R., States Conservation Bureau, quoted 237
Clarke, F. W., quoted, *re* aluminium 58
Clarkson, E. R. C., Hydro-Electric audit by 221
Clay Belt, Ont., burning of slash in 157
Cleveland, consumption of electricity per head in 243
Cliff Distributing Co. 37
  absorption of 221
Clover seeding, results of 133
Clover, results of crop 134, 135, 136
Coal Conservation Committee, in Great Britain 231
Coal, decline in Nova Scotia output 42
  economic utilization of 46
  economy of, reduces demand upon railways 242
  in Canada 246
  production of 42
  reduction in prices of anthracite, unlikely 47
  waste of 242
Coal mining, a Canadian Act urged 47
Coal production, comparison of 228
Cobalt district, Ont., silver production of 43
Cochrane, Ont., forest protection district of 26, 145
Cohoes Power Co. 238
Commercial timber, one-half has been burned over 178
Commission of Conservation Act, drafted by Sir Clifford Sifton 12
Commission of Conservation, achievements of 12
  action of, *re* smoke nuisance 234
  action of, *re* St. Lawrence development 38, 218
  action of, *re* goitre 22
  advocates abolition of patronage in forestry 27
  approval of work of 121
  calls conference on Wild Life 253
  composition of 12
  congratulated on results achieved 214
  drafts Town Planning Act 97
  educational work of 3
  efforts of, appreciated 4
  forest fire protection 217
  forest investigations of 158, 179
  forest research of 161
  forest surveys by 150, 159

PAGE

Commission of Conservation—*Continued.*
interest of, in water storage projects ... 252
investigation of cut-over and burned-over lands by ... 177
origin of ... 3
plans for road sections in Halifax prepared by ... 109
position of, *re* St. Lawrence development ... 219
power survey of ... 249
power survey advocated by ... 246
recommendations of, *re* inspection of buildings ... 51
representations of, *re* forest fire legislation ... 147
responsibility of ... 3
results of investigations by ... 180
rules governing ... 12
special office of ... 103
supplies information on Sitka spruce ... 185
survey of transmission lines by ... 70
work accomplished by ... 5
Committee on Forests, recommendations of ... 161
work of ... 140
Committee on Lands, work of ... 133
Commonwealth Conference ... 104
Commonwealth Edison Co., power of ... 230
Compagnie des Produits Chimiques d'Alais, factories of ... 63
Conservation Association, National ... 3
Conservation, interest in ... 55
Conservation of forests in New Brunswick ... 214
Conservation of game and wild life ... 53
Conservation of Life ... 55, 104, 199
Conservation of Man-Power in Canada ... 56
Congress of United States, action of, *re* housing ... 95
Conservation of Wild Life, conference on ... 253
Consolidated Mining and Smelting Co., Trail, B.C. ... 43
Construction, character of building ... 131
Copper, prices of ... 67
production of ... 43
Copper Cliff, Ont., blast furnaces at ... 48
Cornell University, Forestry department of ... 159
Cornwall, Ont., navigation on St. Lawrence below ... 80
Cornwall canal, lowering of water at head of ... 76
Cornwall island, power canal near ... 88
Corp, Frederick, military experiences of ... 16
Craig, Roland D. ... 31, 33, 55, 158, 185
Crerar, Hon. T. A. ... 125
Crippis-Borgne, France, aluminium plant at ... 63
Croché rivière, Que., forest regeneration studies on ... 171
Croil island, St. Lawrence river ... 38
Cromarty, W. D. ... 105
Crown lands, better forest management required on ... 25
reforestation of ... 156
supervision over cutting on ... 27
Cull, Col., on aerial photography ... 149
Cut-over and burned-over lands need protection ... 183
tree growth on ... 179
Cutting operations, diameter system of regulating ... 160
on Crown lands ... 161
regulation of ... 146

DALZELL, A. S. ... 105
Daily Star, Toronto, quoted ... 221
Daniels, Hon. Orlando T. ... 1, 9, 215, 217
Davis rafts, Sitka spruce made up into ... 189
Dartmouth, N.S. ... 106
Davidson, F. F., report by ... 135
Davis, A. V., quoted ... 60

PAGE
Deer, killing of, to increase meat supply 54
Denis, Leo G., report by 55, 243
Dental Association of New Zealand 21
Destructive Insect and Pest Act 154
Detroit river, interest in channel of 78
interest of Mr. Webster in 79
right to close 83
Dick, W. J., pamphlet on pulverized fuel by 49, 56
reports by 229
resignation of 41
Direct heating for industries 230
Diseased trees 173
Disraeli, Benjamin, quoted 200
Dodge shoal, dredging of 75, 188
Dominion Forestry Branch 162
appointments to 161
co-operates in establishing laboratory 190
Dominion forest reserves, supervision of cutting in 146
Dominion Government, expenditure of, on agriculture 183
housing recommendations of 103
position of, *re* St. Lawrence river 219
Dominion Lands Act, provisions of 148
Dominion, registration of vital statistics 207
Donkin, Hiram, quoted 42
Donnell, Pte. Allan, military service of 15
Douglas fir, qualities of 189
Drink problem a common enemy 204
Dundas county, Ont., horticultural societies in 138
illustration work in 133
results of illustration work in, apparent 35
Dunn, Gano, quoted 40
Dwellings, conversion of, into stores 131
maximum cost of 127
space around 130
Dysentery, occurrence of, in army 198

EAST St. Louis, Ill., alumina plant at 68
Edmonton, Alta., assessment problems of 101
conference at, *re* assessment 19
fuel saving by Alliance Power Co., at 46
town-planning scheme for 113
Edison Electric Illuminating Co., effect of staggered hours of closing on 235
Edwards, Gen. W. E., commends work of R. D. Craig 33
Edwards, Hon. Senator W. C 1, 4, 36, 50
Electrical equipments, special study of 239
Electrical World, New York, quoted 39, 66, 70, 237, 251
Electric Generation and Distribution in Canada 39, 55
Electric heating, restricted possibilities of 236
Electric Power and Supply Committee, recommendations of 252
Electric power, market for 218, 224
Electro-Metals Co., consumption of power by 225
Ellis, J. A., appointed Director of Municipal Affairs 100
England, decrease in convictions for drunkenness in 205
need of public health education in 200
utilizing services of returned soldiers in 97
Entomological Branch, Dept. of Agriculture 173
Division of Forest Insects of 30, 154, 162
quoted *re* destruction by forest insects 178
Epidemic diseases, steps to be taken to obviate 206
Essex-Kent peninsula, Ont., power requirements of 225
Eugenia system, on Beaver river 241
European forests, productivity of 140
Europe, Canadian aluminium exported to 62
Europe (Continental), power used by 243

PAGE

Europe learns how to economize in coal, due to high price 229
Ewing, Lovelace and Tremblay, Messrs 111
Experimental farm at Ottawa, excursions to 138

FARADAY'S law, quoted 60
Farmer's Account Book 35, 56, 137
Federal Dept. of Health 207
establishment of 206
Federal Government, housing loan of 98, 102
Feilding, J. B., pamphlet by 56
Ferguson, Capt. G. H., M.C., military service of 15
Fernow, Dr. B. E., illness of 4
quoted 24
recommendations of, *re* Nova Scotia forests 143
review of forest work of Commission of Conservation, by 10
Ferro-alloys, manufacture of 44
Finance, report by Minister of 123
Fire loss, in Canada 51
large fires responsible for 52
small percentage of, due to dwelling fires 52
Fire Marshal's Dept., notifying 53
Fire prevention, report on 50
Fire Prevention Leagues established 51
Fire protection on Government railways 151
Fire Waste in Canada 55
Fisheries, value of 6
Fish, Game and Fur-bearing Animals, Committee on, calls conference 54
Fishways in the Inland Waters of British Columbia 56
Forest Branch, British Columbia 148
secures aeroplane for patrol work 29
Forest fire patrol, extension of 144
Forest fire protection 144
improvement in 182
in the west 217
Forest fires, areas of land burned over by 177
Forest Insects Division of Entomological Branch, Ottawa 154
Forest planting by pulp companies 31
progress made in 154
Forest Products Laboratory at Montreal 29
Forest Products Laboratory at Vancouver 148
Forest protection, cost of 182
Forest protection lectures 152
Forest ranger course for returned soldiers 148
Forest research, work of Commission of Conservation in 32
Forest reserves, timber cutting on licensed lands in 28
Forest Resources of British Columbia 31, 55, 158
Forest Resources of Saskatchewan 31, 56
Forest resources, surveys of 150
Forest School, at Laval University 145
Forest Service, New Brunswick, forest investigations by 158
Forest Service, Quebec, fire ranging system of 144
forest investigation by 158
increased operations of 26
Forest soil products equal value of wheat crop 184
Forest survey and land classification in New Brunswick 26
Forest survey, plan of 164
Forests and the war 23
cannot regenerate themselves 181
Commission of Conservation's work on 23
making them safe for trees 176
must be recognized as a crop 24
threatened dangers to 184
Forestry Branch, Dominion 28, 147, 148, 149
aids in establishing laboratory 29

PAGE

Forestry Branch—*Continued.*
co-operation of ... 158
forest survey by ... 158
Foster, Hon. Walter E., Premier of New Brunswick ... 215
Foster, Sir George ... 71
France, aluminium production in ... 61, 63
bauxite ores imported from ... 58
developed horse-power of ... 244
effects of war on forests of ... 23
exports of aluminium by ... 64
forests of ... 140
production of bauxite in ... 58, 59
venereal diseases contracted by Canadian soldiers in ... 202
'Free,' discussion as to meaning of, in Ashburton treaty ... 85
French army, experience of, with inoculation ... 196
French Government, banns absinthe ... 204
difficulty of, in securing Sitka spruce ... 185
Fresh air and ventilation, necessity for ... 199
Fuel Administration, United States ... 42
efforts of, in New York ... 238
ruling of, *re* Canada's coal supply ... 49
Fuel and power, national saving of ... 227
Fuel-controlling organizations ... 229
Fuel, every effort must be made to save ... 229
Fuel restrictions and economies ... 228
Fuel shortage, Commission of Conservation gives warning of ... 49
Fuels of Western Canada ... 49, 56
Fungi and insects, forest losses by ... 157
Fungous diseases, serious injury to forests by ... 30
Furnace operation, economies in ... 46

GAME and Wild Life, conservation of ... 53
Game, decimation of, by disease ... 22
Garbage as Feed for Hogs ... 56
Gardner, Hon. O ... 90
General Electric Co., Schenectady, N.Y ... 238
General Electric Power Co., Schaghticoke, N.Y ... 238
Geodetic Survey, co-operation of, in making maps ... 97
Geodetic Society of Ottawa, lecture on aerial photography before ... 149
George, David Lloyd, quoted ... 200
Georgia, bauxite found in ... 68
German army, experience of, with inoculation ... 196
German Empire, area of, served by electricity ... 244
Germany, aluminium production of ... 64
bauxite ores imported from ... 58
largest importer of aluminium ... 64
Germs, basis of disease ... 21
Gilbert and Pogue, Messrs., quoted ... 40, 45
Glenn, Hon. R. B ... 90
Goitre, by Dr. F. J. Shepherd ... 56
Goitre, Commission of Conservation issues pamphlet on ... 22
prevalence of ... 22
Gold, reduced production of ... 43
Gordon creek, drainage of ... 110
Government railways, fires caused by ... 216
fire protection on ... 151
to be placed under Railway Commission ... 162, 217
Grand Lakes coal area, N.B ... 215
Grand'mére, Que., forest nursery at ... 155
Grand portage, International boundary, Lake Superior section ... 78
Grasse river, N.Y., power canal near ... 88
Great Britain, aluminium industry in ... 63
aluminium price in ... 63
development of carbocoal in ... 48

PAGE

Great Britain—*Continued.*
division of, into power districts ... 232
effects of war on forests of ... 23
evil effects of modern life upon ... 199
health of people of ... 200
housing schemes of ... 95
housing expenditure of ... 120
lumber orders of ... 141
manhood of, has degenerated physically ... 207
Migratory Bird Treaty with ... 4
mining and use of coal to be investigated in ... 231
possible fuel and power economies in ... 232
production of aluminium in ... 61
production of bauxite in ... 59
restricts sale of intoxicants ... 204
war work of medical men of ... 192
Great Lakes system, illegal diversion of water from ... 220
Greenwich, record of cerebro-spinal cases at ... 198
Growth studies, lessons from ... 32
Guthrie, Hon. Hugh ... 38, 78, 79, 80, 81, 84, 85
address of, *re* St. Lawrence development ... 77, 219

HALIFAX ... 106
conference on forests at ... 143
County Council of ... 106
planning schemes for ... 107
reconstruction work in ... 95
Town Planning Board of ... 106
Halifax Commercial Club absorbs Civic Improvement League ... 96
Halifax disaster, replanning of devastated area ... 95
report on ... 18
Halifax Herald advocates a Housing Board ... 96
Halifax Relief Commission ... 18, 106
adopts Commission of Conservation schemes ... 96
Hamilton City, Cal ... 69
Hamilton, Ont., improvement plans for ... 19
scheme of development for ... 100
power demands of, reduced ... 224
Handbook for Farmers ... 56, 139
Hardwoods, cutting of ... 159
use of, in newsprint ... 159
Harvard University, Commission's report a text-book in ... 105
Hawkesbury, Ont., improvement plans for ... 19
Hawkesbury Garden Village, Ont., plans for ... 100
Health, Dominion Dept. of ... 199
legislation *re* ... 206
Health problems, investigation of ... 206
Hecate strait, difficulties in towing logs across ... 188
Hewitt, Dr. C. Gordon, co-operation of ... 31
report by ... 54, 56
Hewitt, Prof. E. T ... 197
High mortality, investigation of causes of ... 121
Hodgetts, Col. Chas. A., M.D ... 9, 19, 192
military services of ... 16
Holgate, Henry, quoted ... 37
Horseshoe (Niagara) falls, changes taking place in ... 223
erosion of crest of ... 218, 223
Horticultural societies in Dundas county, Ont ... 138
Hours of closing affect street railways ... 235
Houses, recommendations as to minimum standard in ... 130
Housing Association, National ... 104
Housing Committee of Cabinet ... 17, 103
appointments by ... 105
report of ... 125

PAGE

Housing conditions, investigation of 207
Housing in England 95
Housing loan, Canadian, conditions of 17
orders in council *re* 123
Housing scheme, compliance with general 131
general objects in view in making loan for 126
general principles and standards recommended for 128
general principles to be followed 125
Housing, town planning and municipal government 95
Howe, Dr. C. D. 163, 164, 176
forest investigations of 11
forest surveys by 159
in charge of forest research work 32
research projects by 160
Hoyang, Norway, aluminium plant at 64
Hoyang Falden Aluminium (Norway) 61
Hoyang Falls Co., Norway 60
Hudson Valley railway, N.Y. 238
Hydraulic energy versus coal 245
Hydraulic plants, co-ordination in operation of 253
Hydraulic Power and Manufacturing Co 37
absorption of 221
efficiency of 222
Hydro-Electric Power Commission of Ontario 224, 247
audit of 221
contracts of 225
extension of 36
interconnection of plants of 240
power projects of 220
reduces consumption 36
Hydro-electric *versus* steam-electric power 40
Hygiene, beneficial results of 194

ILLUSTRATION county work 34
results apparent in 133
Imperial Ministry of Munitions 158
Inspection Dept. of 190
services of R. D. Craig loaned to 31
Imperial Munitions Board 158, 185
action of, to secure Sitka spruce 33
aid in establishing Vancouver Forest Products Laboratory 29, 148
prices paid for Sitka spruce logs by 188
Income, limit of, of persons to be provided with dwellings 129
India, production of bauxite in 58, 59
Indian Affairs, Dept. of, slash disposal requirements by 156
Individual life, insignificance of 3
Industrial establishments, economies in heating in 46
Influenza, epidemic of 22
reduction of coal output due to 50
Insects and fungi, forest losses by 157
Insurance Branches, regulations of 53
Intercolonial Ry., causes millions of dollars loss by forest fires 216
under government system 30
International Joint Commission 219
application for St. Lawrence power to 37, 72
approval of application by 72
assumption of power by 92
consents to application 38
decision of 89
establishment of 88
hearings of, at Atlantic City, N.J. 77, 87, 82
hearing of, in Montreal 70

PAGE

International Joint Commission—*Continued.*
interim order of ... 87
jurisdiction of, questioned ... 73, 83
no changes in boundary waters without approval of ... 80
order of, allowing application ... 91
re St. Lawrence powers ... 218
ruling of, protested by Canada ... 92
International Nickel Co. ... 43
refining plant of ... 43
uses pulverized coal ... 48
Investigation, its effect on waste ... 2
Italy, aluminium plants in ... 64
production of aluminium in ... 61
production of bauxite in ... 58, 59
Ithaca, N.Y. ... 159

JAMES, C. C., quoted ... 34
Japan, Canadian aluminium exported to ... 62
Johnston, Miss Norma, death of ... 15
Johnston, Thomas, report by ... 136
Jones, Dr. C. C., illness of ... 4
Justice, Dept. of, decision *re* Commission of Conservation ... 3

KANSAS University, Commission's report a textbook in ... 105
Kennedy creek ... 171
Kerr, F. M., quoted ... 70
Khaki University, London, Commission's reports used in ... 55
Kipawa, Que., plan of town of ... 98, 110
town planning of ... 18
Kipawa Fibre Co., plans of ... 98
town planning for ... 18
Kipawa lake, Que., water-power from ... 110
Koonce, George W. ... 77, 80, 83, 84

LABOUR, machinery and equipment ... 137
Lake Edward, Que., sample plots established at ... 173
Lakelse, B.C., saw-mills established at ... 188
L'Allumino Italiano (Italy) ... 61
capital of ... 64
L'Aluminium Française, of France and Norway ... 61
Lancet, quoted ... 20
Land, proportion of cost of, to dwelling ... 129
La Praz, France, aluminium plant at ... 63
Laurentian Forest Protective Association ... 26, 144
Laurentide Company ... 32
co-operation in forest research work by ... 32
distribution of diameter classes on limits of ... 171
forest planting by ... 31, 152, 162
forest surveys on lands of ... 159, 164
forestry division of ... 155
regenerative studies on limits of ... 171
sample plots on limits of ... 173
Laurier, Sir Wilfrid, Commission of Conservation established by ... 5
Lea, Messrs. R. S. and W. S. ... 112
prepare plans for water and sewers at Kipawa ... 99
Lead and zinc, war development of ... 44
Leavitt, Clyde ... 140
quoted ... 24
services of, appreciated ... 11
Legal and other costs ... 131
Lend-Gastein, Austria, aluminium plant at ... 63
Lethbridge, Alta., town-planning scheme of ... 113
Lighthall, W. D. ... 122
Light, saving of, in factories ... 230

PAGE

Little, Arthur D., quoted *re* natural resources 13
Little, Brown & Co., Boston 78
Little, Lieut. E. Carruthers, military service of 16
Little river, application for the erection of a dam in 219
Little Tennessee river, electric smelting plant on 68
power development on 63
Load factors, special study of 239
Loans, conditions on which granted by Federal Government 127
for separate or individual houses 129
terms of years for repayment 128
to be used for purchasing land and erecting dwellings 129
Local Government Board of England 17, 205
Local Government Board of Saskatchewan 119
Local improvements to precede occupation of dwellings 129
Logan County Light and Power Co., power plant of 233
Logging slash burned 149
London, Eng., generating stations in 232
London, Ont., housing at 100
power demands of, reduced 224
town planning and housing at 19
London Oil Congress 45
Long Sault channel, passage of 78
Long Sault Development Co 82
Long Sault island, St. Lawrence river 38, 73, 88
power canal to 87
treaty rights in St. Lawrence channel at 77
Loughlin, Jos., report by 136
Lumber, large export orders for, placed in Canada 24
Lumber industry, capital invested in 176
employees of 176
value of 176
Lumsden, John 110
Lumsden Mills 110

MACAZA valley, growth studies in 165
number of times cut over 169
MacKay, J. F 1
Mackie, H. A., M.P., urges Canadian Coal Mining Act 47
Maclean, Hon. A. K 125
Madison river, transmission lines on 69
Magrath, Charles A 42, 82, 90
appointed fuel controller 50
Magnesite, production of 44
Manitoba, coal shipped to 42
director of housing for, urged 101
forest fire legislation of 147
forest fire patrols on Transcontinental Ry. in 150
grazing of reindeer in 54
improved forest fire legislation in 27
power supply of 248, 250
Town Planning Act in 100
white pine blister rust not found in 153
Manitoba Government, action *re* town planning during war 19
Man-made forest conditions 176
Manufacturing, in Canada 6
Manufacture of Aluminium, quoted 60
Marcellus, Charles 136
Maritime Provinces, forest losses by fire in 216
power of 247
power plants in 250
Martin, Hon. William M., action of, *re* protection of wapiti 54
Maryville, Tenn., aluminium plant at 62
aluminium production at 39

PAGE

Massachusetts, improvement of water-power plants in 250
interconnection of power plants in 240
Massachusetts Gas and Electric Light Commission 240
Massena, N.Y. 87
aluminium plant at 62
aluminium production at 39
power-house at 88
St. Lawrence Power Co.'s plant at 38
Masset Inlet, B.C., saw-mills established at 188
Master, Pte. Oliver, military service of 16
Mauretania, effect of fuel oil upon operation of 45
McCool, C. A. 1, 9, 163, 208
McGill University, Forest Products Laboratory at 148
McKay, Pte. Frederick N., military service of 16
McLeish, John, quoted 41
McMillan, H. R. 158, 185
Mechanicsville, power plant on Hudson river at 238
Medical diagnosis, new 20
Medical men offer services for war work 192
Medical Research Committee 197
Medicine Hat, Alta., town-planning scheme for 113
Medicine in war—some sanitary lessons 192
Mediterranean area, paratyphoid in 196
Meighen, Hon. Arthur, address by 1
Chairman of Water-Power Board 226
Mercier, Hon. Honoré, action of, *re* bird sanctuaries 53
Mexico, output of petroleum in 45
Mignault, P. B. 78, 79, 80, 86, 90
Migratory Birds Convention Act, regulations under, in effect 53
Migratory Birds Treaty, credit for passing of 4
Military service of staff 15
Milk river, Alta., diversion of waters of 92
Mineral Industry during 1917, quoted 38, 39, 59, 64
Mineral production in Canada 41
Mining laws, should be identical 47
Ministry of Health, established in Great Britain 205
has power to inspect school children 205
Ministry of Munitions, French, fixed price of aluminium 63
Ministry of Reconstruction, Great Britain 41
recommendations of 252
report of 231
Minnesota forest fire disaster 157
Mond Nickel Company 43
Montana Power Co., transmission lines of 69, 70
Montreal, consumption of electricity per head in 244
Forest Products Laboratory at 29
hearing of International Joint Commission at 72, 189
housing problems in 99
model village suggested for 19, 99
Moose, slaughter of, in Yukon 54
Moresby island, B.C., saw-mills established on 188
Mortimer, N.Y. 69
Motor tractors, use of for winter log-hauling 159
Municipal Affairs, British Columbia, Dept. of 102
Municipal Affairs, Quebec, Dept. of 19, 99
Municipal Bureau, National 104
Municipal fuel supplies 152
Municipal Gas Co., of Albany 238
Municipal responsibility in regard to economic development of the land 117
Murray, Dr. Howard 1, 8, 163, 208
Muskoka river, power development on 241
Muskoka system, co-ordination of power plants of 241

PAGE

NASH, Arthur, report by 136
National Abrasives Co., power requirements of 225
National and municipal housing 116
National Conservation Association 3
National Council for Combating Venereal Diseases 212
National Health Laboratory, work of 206
National Museum, United States 40
National Railway System under Railway Commission 30
Navigable boundary waters 81
Ne-ha-sa-ne park, forest investigations in 159
Neuhausen, Switzerland, aluminium plant at 63
New Brunswick, coal in 215
control of cutting operations in 162
Dept. of Health in 97
Fire Marshal Act required for 51
forest fire patrols along railways of 150
forest legislation in 141
forest rangers of, under civil service conditions 27
Forest Service of 142, 161
forest survey in 11
Health Act in 214
lectures on forest protection in 152
logging operations carelessly conducted in 214
mining laws for 47
Minister of Lands and Mines of 214
natural resources of 214
new forestry legislation in 25
power of 247

protection of forests in 217
Provincial Forester for 142
supervision of cutting operations in 146
tank cars for fire fighting at points in 151
town planning in 96
water-power investigation in 218, 227
white pine blister rust not found in 153
New England States, economy of interconnection of plants in 252
Fuel Administrator's efforts in 240
New York and Ontario Power Co., application to erect a dam by 39, 219
New York, consumption of electricity per head in 243
prices of metals at 65
New York, State of, grants right to build dam at Long Sault 83
New Zealand, aluminium transmission lines in 70
Niagara falls, increased development of power at 218
Niagara Falls Power Co 37, 221
Niagara Falls, N.Y., aluminium plant at 62
aluminium production at 39
Niagara Falls, Ont 225
Niagara river, electric smelting plant on 68
power developments of 36, 247
power situation on 220
proposed development of powers of lower 222
total head available in 220
waters of, allotted 36, 223
Niagara system, co-ordination of power plants of 241
publicly owned 248
Nickel refining in Ontario 43
Nipigon, forest district of 26, 145
Nipissing, lake, Ont., white pine blister rust south of 153
Nord, Cal., transmission line to 69
North American Reindeer Co. to import reindeer 54
Northern Aluminium Co. of Canada 58, 61
Northern California Power Co 69
North Sault channel, construction of dam in 82

PAGE

Northwest Game Act, regulations under, in effect 53
Northwest Territories, grazing reindeer in 54
Norway, aluminium plants in 63, 64
aluminium transmission lines in 70
production of aluminium in 61
Notification of Births Act, 1907 209
Nova Scotia, all available land in, granted to settlers 217
appointment of Provincial Forester for 25, 143, 161, 217
coal areas of 215
conference on forest protection in 143
decline in coal output of 42
Fire Marshal Act required for 51
forest fire losses in 25, 216
forest fire protection in 11
forest survey in 11
future of forests of 144
improved forest conditions in 25
lectures on forest protection in 152
mining laws for 47
town planning progress in 95
Nunnick, F. C 35, 56, 133

OATS, results secured in planting of 134, 135, 136
Octagonal lake, Que., sample plots established at 173
Ogden island, N.Y., erection of a dam near 219
Ogilvie, N.J 97
Ojibway, Ont., plans for 19
scheme for new town of 100, 110
Oklahoma, oil fields of 46
Oliver, Hon. John, Premier of British Columbia 102
Ontario, approval of housing scheme of 132
Civil Service Commissioner appointed for 27
civil service regulations of, inadequate 146
extension of merit system of appointment to Forest Service of 161
fires in Clay Belt of Northern 157
Fire Protection League established in 51
forest fire patrols along railway lines of 150
forest fire protection in 26
forest planting in 162
forest protection equipment of 145
forest resources of 158
forest revenue of 145
housing appropriation of 19, 100, 103
lectures on forest protection in 152
municipal improvement work in 99
no control of cutting operations in 162
power conditions of 247
railway patrols by Forest Service of 150
reforestation by 156
revenue of, from forests 184
substitute for anthracite coal must be found for 48
survey of forests of 31
white pine blister rust in 153
white pine blister rust not found in Northern 153
wood from Algonquin park for 152
Ontario Power Co., contracts of 225
new pipe-line of 220
Orders in council *re* St. Lawrence River Power Co 71, 91
Orders in council on housing 123
Organization of Resources Committee, work of 139
Oregon University, lectures given in 104
Orillia system, developments of 240
Orland, Cal., transmission lines at 69
Oshawa, Ont., town planning and housing at 19, 100

PAGE

Osler, Sir William, letter from, quoted 203
Ottawa Horticultural Society 139
Ottawa River Forest Protective Association 26, 144
Ottawa river, lake Timiskaming portion of 110
Owen, Ald. W. R., Vancouver 116
Ownership of land 128

PACIFIC coast, timber-testing laboratory required for 148
Panama canal, construction of, compared to coal production 228
Paratyphoid fever 196
Parks Branch, Dominion 149
Parry Sound, Ont., forest inspection district of 145
forest protection district of 26
Patronage, abolition of, in Dominion Forestry Branch 27
abolition of, required in all forest work 146
Peace River Block, forest legislation applicable to 147
Peat producing equipment being constructed 229
Pennsylvania, oil fields of 46
report of State Fuel Administrator of 239
Percé rock, Que., a bird sanctuary 53
Perry, Mayor, of Prince George, B.C 122
Petawawa, Ont., investigations of forest conditions in 158
Petroleum and its products 44
Physical inefficiency revealed by army examinations 199
Piché, G. C., Quebec Provincial Forester 156
Pigeon river, Ont 78
Pittsburg, Pa., consumption of electricity per head in 243
Planning and Development Act, Ontario 99
amendment of, required 19
Planning the Greater Halifax 106
Plant pathology, field laboratory of 154
Playgrounds, reservation of sites for 129
Point Pelee, Ont., a national park 53
Pollution of streams, investigation of 207
Port Borden, P.E.I., new town of 18
town-planning scheme for 97
Port Colborne, Ont., nickel refining plant at 43
Port Elgin, Ont., new hydro-electric development at 241
Port McNicoll, Ont., power for elevator at 241
Potatoes, results secured in planting 134, 135, 136
Powell, Henry A 79, 80, 82, 85, 86, 90
Power, necessity for cheap supply of, in Britain 244
saving of, in factories 230
world's use of 243
Power production, growth of 237
Power resources, care required in development of 245
Power situation in Canada 243
Power survey, desirability of 243
Prairie Fires Ordinance of Alberta 162
revision of 147
Prairie Provinces, advantages of central power plants for 251
assessment system in 118
power supply of 248
Press and Co-operating Organizations, Committee on 54
Prince Edward Island, passes Town Planning Act 18
power used in 247
Town Planning Act in 97, 120
Prince Edward Island Ry., under Government system 30
Prince Rupert, B.C., saw-mills established at 188
Sitka spruce logs towed to 189
Printing and Stationery, Dept. of, Commission of Conservation's printing brought under 56
Privy Council, action of, *re* St. Lawrence power development 71
Promotion of housing schemes 127

PAGE

Provincial Governments, housing designs for ... 105
Public Health Committee, recommendations of ... 206
Public Health Conference, Dominion ... 206, 207
Public Health legislation, harmonizing of ... 206
Public Utility Commissioners, application to ... 113
Pulp and Paper Association, endorses work of Commission of Conservation ... 32
Woodlands Section of ... 160
Pulp and paper industry, growth of ... 24
Pulp resources require conserving ... 6
Pulverized coal, success of ... 48
Pulverized Fuel, by W. J. Dick ... 49, 56

QUEBEC, consumption of electricity per head in ... 244
control of cutting operations in ... 162
establishes bird sanctuaries ... 53
fire-fighting tank cars at points in ... 151
Fire Marshal Act required for ... 51
forest protective association of, uses hydroplanes ... 149
forest fire patrols along railways of ... 150
forest planting by ... 31, 154, 163
forest protection in ... 26
forest protection organizations of ... 144
forest regeneration survey ... 164
housing problems of ... 99
lectures on forest protection in ... 152
legislation to enforce patrol of licensed timber berths in ... 161
planning to sell denuded Crown lands for reforestation ... 163
power conditions of ... 247
power plants in ... 250
Provincial Forester's report for ... 144
revenue of, from forests ... 184
substitute for anthracite coal must be found for ... 48
supervision of cutting operations in ... 146
Town Planning Act suggested for ... 98
white pine blister rust in ... 153
Quebec Government, approval of plans of Kipawa by ... 110
Queen Charlotte island, B.C., Sitka spruce on ... 187, 188

RAILWAY Belt, forest legislation applicable to ... 147
Railway Commission, co-operation of, in forest fire protection ... 143
co-operation of Nova Scotia Provincial Forester with ... 25
Fire Inspector in Nova Scotia required for ... 161
fire regulations of ... 217
forest fire requirements imposed by ... 162
Provincial Forester an officer of ... 144
Provincial railways in Alberta not under ... 28
railways subject to ... 150
railways not subject to ... 147
Railway electrification ... 234
Railway fire protection ... 30, 150
Railway War Board, special car provided by ... 152
Randall, H. E., quoted ... 62
Reforestation of Crown timber land ... 156
Refrigeration, fuel economies in ... 230
Regain of electricity ... 235
Renfrew, Ont., town planning and housing at ... 19, 100
Research Council suggests briquetting lignite ... 47
Research work, need of ... 207
Resources of Canada over-estimated ... 5
Returned soldiers, problem of ... 122
Revenue from forests should be reinvested ... 183
Rheinfelden, Germany, aluminium plant at ... 63
Right-of-way clearing operations ... 151

PAGE
Riordon Pulp and Paper Co....32, 100, 110, 155
co-operation in forest research by.... 32
forest planting by....31, 154, 162
forest survey on limits of....159, 164
sample plots on limits of.... 173
Rittenhouse, L. H.... 233
Rived spruce too wasteful.... 189
River Rouge, Que., investigation of pulpwood lands on.... 179
Roberts, Hon. Dr., Minister of Health in New Brunswick.... 214
Robertson, Dr. J. W., absence of.... 4
Robertson, Hon. Gideon.... 125
Robertson, J. M., quoted.... 243
Roche, Hon. Dr.... 207
Rochester, N.Y....69, 104
Rochester (N.Y.) Railway and Light Co.... 69
Rooms, height and size of.... 131
Roosevelt, Theodore, death of.... 3
Ross and Macdonald, Messrs.... 112
Rouge river, Que.... 165
Rowell, Hon. N. W....125, 132
Royal Commission on Venereal Diseases.... 204
Rural Planning and Development.... 105
Russia, eliminates vodka.... 204
output of petroleum in.... 45

ST. CATHARINES, Ont., field laboratory at.... 154
St. Clair river, Ont., interest of Lord Ashburton in.... 79
St. Claire Deville method of aluminium production.... 57
St. Felix de Maurienne, France, aluminium factory at.... 63
St. Jean de Maurienne, France, aluminium factory at.... 63
St. John, N.B., town-planning scheme of.... 18, 96
St. Jovite, Que., forest nursery at.... 155
St. Lawrence river, application to erect a dam in.... 39
Canada's share of water-power of.... 248
channel of, at Long Sault island.... 77
construction of works in.... 91
control of.... 219
development of.... 219
electric smelting plant on.... 68
interest of Lord Ashburton in.... 79
obstructions to navigation in.... 83
power application for.... 218
power developments of.... 247
right to close.... 83
submerged weir in.... 87
water for power purposes from.... 218
St. Lawrence River Power Co....37, 83, 84, 87, 88, 91, 92
application of....71, 218
application should be withdrawn.... 75
memorandum of Canadian position *re*.... 71
United States issues permit to.... 72
St. Mary river, Alta. and Mont., division of waters of.... 92
St. Maurice Forest Protective Association....26, 144
hydroplanes used by....29, 149
St. Maurice River power developments.... 247
St. Maurice valley, Que., forest surveys in....159, 160
investigation of pulpwood lands in.... 179
St. Williams, Ont., forest nursery at.... 156
Salindres, France, aluminium factory at.... 57
Sample plots established.... 173
San Francisco, Cal.... 69
Sanitary conditions and ventilation.... 130
Sanitary District of Chicago.... 220
Sanitary District Power Co. supplies power.... 230

PAGE

Sanitary provision ... 130
Sanitation, benefits of, in army ... 193
Saskatchewan, assessment system in ... 118
Deputy Minister of Municipal Affairs for ... 119
forests of ... 157
forest legislation of ... 147
forest survey of ... 11
improved forest fire legislation in ... 27
decimation of game in ... 22
legislation protecting wapiti in ... 54
power supply of ... 248, 251
Town Planning Act for ... 101, 120
Saugeen river, Ont., power development on ... 241
Schools, agricultural education work in ... 138
School fairs, agricultural educational work of ... 138
School teachers attend agricultural short courses ... 138
Secretary of State for External Affairs, report from ... 91
Secretary of War (United States), letter from ... 88
issues permit to St. Lawrence River Power Co ... 72
re St. Lawrence development ... 84
Sera and vaccines, manufacture of ... 206
Settlers' clearing slash, safe disposal of ... 157
Settlers' permits for brush burning ... 27
Settlers' slashings burned ... 144
Severn river, Ont., power from ... 240
Seymour, H. L ... 95, 105
Shawinigan Falls, Que., aluminium works at ... 58, 61
aluminium production at ... 39
power used by aluminium plant at ... 62
Shawinigan Water and Power Co ... 40, 248
Shell shock, effect of ... 20
Shepherd, Dr. Francis J ... 22, 56
Shipping interests, Canadian, position of, *re* St. Lawrence development ... 219
Sifton, Sir Clifford ... 8
resignation of ... 5, 12, 105
resolution *re* resignation of ... 8
Silver, decline in production of ... 43
Silviculture, practice of, in Canada ... 24, 141
Sir Wilfrid Laurier, illness of, referred to ... 2
Sitka spruce, cutting rights secured for ... 188
difficult to transport ... 189
for aeroplane work ... 185
increase in production of ... 34
inspection of ... 190
need of conservation of supply ... 191
production of ... 190
superior to all other wood for aeroplanes ... 186
Skeena City, B.C., saw-mills established at ... 188
"Skip-stop" system for street railways ... 235
Slash burning, compulsory ... 156
Small power plants inefficient ... 249
Smith, Hon. E. A ... 1, 214
Smith, J. Grove, report, *Fire Waste in Canada*, by ... 50, 55
fire loss investigation by ... 52
Smith, Julian C., quoted on cost of power ... 40
Smoke nuisance, elimination of ... 234
Smyth, Samuel, meeting on farm of ... 133
report of ... 134
Société Electrometallurgique Française, plants of ... 63
Sognefjord, Norway, aluminium factory in ... 60
Solicitor General, address of, *re* St. Lawrence development ... 219
Sons of Canada quoted ... 12
South African war, typhoid fever during ... 193
South America, power used by ... 243

PAGE
Southern St. Lawrence Forest Protective Association....26, 144
South falls, Muskoka river, power development at.... 241
South Sault channel.... 73
application to construct works in.... 71
necessity for haste in construction of works in.... 74
project to construct works in.... 91
protest *re* diversion of water from.... 84
submerged weir built in....71, 219
used by boats.... 82
Spanish-American war, typhoid fever cases during.... 194
Spanish River watershed, Ont.... 37
Speir Falls, N.Y., power plant at.... 238
Spruce, reproduction of.... 180
scarcity of.... 173
slow growth of.... 165
Staff, military service of.... 15
Standardization of electrical equipment.... 231
Stangfjord, Norway, aluminium plant at.... 64
Steam turbines, increased efficiency of.... 230
Steel, production of.... 44
Steinmetz, Dr. C. P., quoted.... 245
Stirling, John T., quoted.... 47
Stores, conversion of dwellings into.... 131
Strader, Orrin, report by.... 136
Street plan of devastated area of Halifax.... 108
Streets, conditions of.... 130
study of pulpwood reproduction in.... 32
Suburban electric lines.... 235
Sudbury, Ont., forest inspection district of....26, 145
copper production at.... 43
Suicide of the Horseshoe Falls.... 223
Superior, lake.... 78
Superintendent of Insurance, Dominion, advisory committee appointed by.. 51
Supreme Court of United States.... 83
Surgery, advancement of.... 193
Swaine, J. H., census of diseased trees on sample plots, made by.... 173
co-operation of.... 31
quoted, *re* destruction of forest insects.... 178
Sweden, aluminium transmission lines in.... 70
Swift rapids, Severn river, power development at.... 240
Switzerland, aluminium plants in.... 63
aluminium exports of.... 64
aluminium production of.... 61, 64

TANK cars for fire fighting.... 151
Taschereau, Hon. L. A., *re* Town Planning Act.... 18, 98
Tawney, James A....79, 81, 84, 85, 90
Taylor, Major Austin....158, 185
Teeth, chronic diseases due to.... 21
Tennessee, water-power development in.... 63
Terrace, B.C., saw-mills established at.... 188
Texas, oil-fields of.... 46
The Mineral Industry during 1917 quoted.... 61
Thorold, Ont., power at.... 225
Timber areas, disposal of.... 142
Timber, export trade in, necessary.... 23
Timber resources, limitation of.... 6
Timber-testing laboratory established.... 148
Times, London, quoted....20, 22, 203
Timiskaming, lake, Ont. and Que.... 110
Todd, Mayor A. E.... 116
Topographic maps, use of.... 97
Toronto, aeroplane factory at.... 185
consumption of electricity per head in.... 243
power demands of, reduced.... 224

PAGE
Toronto Power Co., contracts of ... 225
Toronto University, credit to Faculty of Forestry of ... 11, 164, 176
Tory, Dr. Henry M., absence of ... 4
Toulmain, F. J. ... 165
Towing difficulties in delivering logs ... 188
Town Planning Acts in force ... 120
Town Planning Act, in Saskatchewan ... 107
Town Planning Institute formed ... 105
Town Planning in relation to land taxation ... 113
Trail, B.C., copper and zinc refineries at ... 43
Transcontinental Ry., fire ranging system along ... 26, 144
under Government system ... 30
water-power along line of ... 253
Transmission lines, aluminium ... 66
cost of ... 68
Transportation costs affect marketing of hardwoods ... 159
Treaties, value of ... 77
Treaty, International Boundary Waters, 1909 ... 80, 89
Trent Valley power developments ... 247
Tresfilierie et Lamaniti di metalli, aluminium plant of ... 64
Tresfilieries du Horre, aluminium plant of ... 64
Truro, N.S., Agricultural College at ... 143, 161
Turbines, success of steam ... 39
Tye, W. F. ... 1, 100
Tyler, President, message of, transmitting Ashburton Treaty ... 79
Typhoid fever and anti-typhoid inoculation ... 195
Typhoid fever, few cases during war ... 193
Typhoid inoculation at Valcartier, Que ... 196
Tyssedal, Norway, aluminium plant at ... 64

UNECONOMICAL plants and processes, elimination of ... 230
Union Carbide Co., power consumption of ... 225
Union of British Columbia Municipalities ... 102
Union of Canadian Municipalities ... 102, 116
Union of Nova Scotia Municipalities, meeting of ... 96
Union of Saskatchewan Municipalities ... 119
United Kingdom, powers used by ... 243
production of bauxite in ... 58
United States, aeroplane spruce from ... 185
aluminium exported to ... 62
aluminium plants in ... 62
aluminium transmission lines in ... 66
approval of Canadian housing scheme in ... 103
bauxite ores imported from ... 58
central steam plants in ... 233
Commission's report a text-book in universities of ... 105
compelled to curtail coal consumption ... 227
considers water-power legislation ... 219
efforts in, to secure increased power ... 251
electrical energy demand of ... 245
Fuel Administration, efforts of, to save power ... 230
housing appropriation of ... 120
Migratory Birds Treaty with ... 4
no changes in boundary waters without authority of ... 80
opinion of Director of Railways of, *re* railway electrification ... 234
output of petroleum in ... 45
permit granted for weir in St. Lawrence by ... 87
places embargo on currant and gooseberry plants ... 154
position of, *re* St. Lawrence river ... 88
power used by ... 243
production of aluminium in ... 61, 64
production of bauxite in ... 58, 59
report of sub-committee on water-power development, United States Chamber of Commerce ... 226

PAGE

United States—*Continued.*
Sitka spruce orders placed in 185
Sitka spruce, supply of, in 33
timber sales policy of 142
water at Niagara Falls allotted to 36
water-power legislation of 226
water-powers on navigable rivers of 219
will control fuel regulations 229
United States Forest Service, in charge of cutting in national forests 27, 146
requires slash disposal 157
United States Government, aluminium demands of 38
connection of, with conservation 3
endorses application for St. Lawrence power 72
position of, *re* St. Lawrence River development 71
United States War Dept., permit of, *re* St. Lawrence River construction 37, 218
Sitka spruce supplies for 185
University of British Columbia, Forest Laboratory at 29, 190
Urban Planning and Development 56
Utilization of Fish Waste in Canada 56

VACCINATION against smallpox and typhoid fever 194
Valcartier, Que., inoculation at 196
Vancouver, B.C., forest ranger course at 29, 148
Vancouver, B.C., meeting at 102
Vancouver island, hydro-electric plants on 249
Venereal disease, among civil female population 202
among soldiers 201
and demobilization 203
can be prevented 202
conference on 201
National Council for combating 203
number of cases of, treated 209
prevalence of 201
results secured by prophylaxis 202
suggestions for combating 210
summary of report of Royal Commission 209
Victoria, B.C., conference at 102, 116
Vigeland, Norway, aluminium plant at 64
Villeneuve et Borgo-franco, aluminium plant of 64
Virginian Power Co., Charleston, electric power plant of 233
Vocational Education Board 148, 149
Volkmar, A. C., forest engineer 155

WADDINGTON, N.Y. 39
Walker, Capt., C.A.M.C 201
Wallace, Dr. Sim, quoted 21
War conditions emphasize conservation 14
War Department, United States, issues permit for weir in St. Lawrence 37, 218
Sitka spruce supplies for 185
War Industries Board, United States, Chairman of 88
policy of 233
War, its effect on conservation 2
part of forests in 140
War Measures Act, housing appropriation under 123
Wasdell Falls, Ont., hydro-electric system 240
Washington, D.C., conference at 104
Washington (State) University, Commission's report a text-book in 105
Waste, due to the war 2
Waste in mining 47
Water and water-powers 36
Water-power and fuel problems 218
Water-Power Board, Dominion, created 226
Water-powers developments, anticipated 224
Water-Powers of British Columbia 14, 56

PAGE

Water-Powers of Canada....6, 14, 244
Water-Powers of Manitoba, Saskatchewan and Alberta.... 14
Water-power, proposed new legislation regarding.... 226
reports on, published.... 14
Water storage reservoirs.... 252
Water supply.... 130
improvement and protection of, in France.... 194
Webster-Ashburton Treaty....37, 38, 73, 77, 84, 86, 88, 89
rights under.... 83
Webster, Hon. Daniel.... 78
draft treaty in handwriting of.... 79
Wells, Durham, report by.... 135
West Penn Power Co., power plant of.... 233
Wet weather affects crops.... 134
White, Arthur V....39, 218
estimate of Canada's water-power by.... 248
pamphlet by.... 56
White, James....36, 50, 217
annual statement by.... 10
Fuels of Western Canada, by.... 49, 56
White, Sir Thomas.... 1, 4
White pine blister rust, continued efforts to eradicate....153, 162
prevalence of.... 30
Whitford, Dr. H. N....31, 158
Forests of British Columbia, by.... 55
Wild Life, Conference on, called.... 54
Wild Life Resources and their Conservation.... 54, 56
Willison, Sir John.... 100
Winchester fair, Commission of Conservation at....35, 138
Windsor, Ont., town planning and housing at....19, 100
Winnipeg, coal shipped to.... 42
Winnipeg river, power developments on.... 248
Wisconsin, interconnection of power plants in.... 251
Wood fuel, Commission of Conservation urges increased use of.... 49
should be sold by cord....153, 162
to relieve coal shortage.... 152
Wood Fuel to Relieve the Coal Shortage in Eastern Canada.... 56
Wood products laboratory established in British Columbia.... 29
Wood-testing laboratory.... 190
Woods, lake of the.... 78
Works of Daniel Webster.... 78

YORK, G. C., report by.... 135
Young tree growth, on logged-over areas.... 166
destroyed by fire.... 145
Yukon, slaughter of moose in.... 54

ZAVITZ, E. J., Provincial Forester.... 25
Zinc, war production of.... 44

Commission of Conservation
Canada

NATIONAL CONFERENCE
ON
CONSERVATION OF GAME, FUR-BEARING ANIMALS AND OTHER WILD LIFE

UNDER THE DIRECTION OF THE
COMMISSION OF CONSERVATION
IN CO-OPERATION WITH THE
ADVISORY BOARD ON WILD LIFE PROTECTION

FEBRUARY 18 and 19, 1919

OTTAWA
J DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

63267—A½

Commission of Conservation

Constituted under "The Conservation Act," 8–9 Edward VII, Chap. 27, 1909, and amending Acts 9–10 Edward VII, Chap. 42, 1910, and 3–4 George V, Chap. 12, 1913.

Chairman:

Sir Clifford Sifton, K.C.M.G.

Members:

Dr. Howard Murray, Dean, Dalhousie University, Halifax, N.S.
Dr. Cecil C. Jones, M.A., Ph.D., Chancellor, University of New Brunswick, Fredericton, N.B.
Mr. William B. Snowball, Chatham, N.B.
Hon. Henri S. Beland, M.D., M.P., St. Joseph-de-Beauce, Que.
Dr. Frank D. Adams, Dean, Faculty of Applied Science, McGill University, Montreal, Que.
Mgr. Charles P. Choquette, M.A., St. Hyacinthe, Que., Professor, Seminary of St. Hyacinthe, and Member of Faculty, Laval University.
Mr. Edward Gohier, St. Laurent, Que.
Mr. W. F. Tye, Past-president, Engineering Institute of Canada, Montreal, Que.
Dr. James W. Robertson, C.M.G., Ottawa, Ont.
Hon. Senator William Cameron Edwards, Ottawa, Ont.
Mr. Charles A. McCool, Pembroke, Ont.
Sir Edmund B. Osler, M.P., Governor, University of Toronto, Toronto, Ont.
Mr. John F. MacKay, Toronto, Ont.
Dr. B. E. Fernow, Dean, Faculty of Forestry, University of Toronto, Toronto, Ont.
Dr. George Bryce, University of Manitoba, Winnipeg, Man.
Dr. William J. Rutherford, B.S.A., Dean, Faculty of Agriculture, University of Saskatchewan, Saskatoon, Sask.
Dr. Henry M. Tory, M.A., D.Sc., President, University of Alberta, Edmonton, Alta.
Mr. John Pease Babcock, Assistant Commissioner of Fisheries, Victoria, B.C.

Members ex-officio:

Hon. T. A. Crerar, Minister of Agriculture, Ottawa.
Hon. Arthur Meighen, Minister of the Interior, Ottawa.
Hon. Martin Burrell, Secretary of State and Minister of Mines, Ottawa.
Hon. Aubin E. Arsenault, Premier, Prince Edward Island.
Hon. Orlando T. Daniels, Attorney-General, Nova Scotia.
Hon. E. A. Smith, Minister of Lands and Mines, New Brunswick.
Hon. Jules Allard, Minister of Lands and Forests, Quebec.
Hon. G. H. Ferguson, Minister of Lands, Forests and Mines, Ontario.
Hon. Thomas H. Johnson, Attorney-General, Manitoba.
Hon. Charles Stewart, Premier, Minister of Railways and Telephones, Alberta.
Hon. T. D. Pattullo, Minister of Lands, British Columbia.

Assistant to Chairman, Deputy Head:

Mr. James White.

CONTENTS

	Page
Opening Proceedings	1
Address of Welcome *By Hon. Arthur Meighen*	3
The Need of Nation-Wide Effort in Wild Life Conservation *By Dr. C. Gordon Hewitt*	8
Discussion	16
Relation of Indians to Wild Life Conservation *By Duncan Campbell Scott*	19
Discussion	21
Gun Licenses	39
Fish and Game Protective Associations	43
Wild Life Sanctuaries *By J. B. Harkin*	46
Discussion	50
Game Preserves in Eastern Provinces	57
The Rational Use of Game Animals *By Dr. W. T. Hornaday*	60
Sale of Game	69
Game in Cold Storage	72
The Migratory Bird Treaty *By E. W. Nelson*	74
Attracting Wild Fowl *By Jack Miner*	82
A Farm Sanctuary *By Edith L. Marsh*	92

Page

The War and Game 95
By John B. Burnham

Migratory Birds Convention 99

Co-operation in the Regulation of the Fur Trade 122
By J. A. Bellisle

The Use of Pump and Automatic Shotguns 130

Fur Statistics 134
By R. H. Coats

The Need and Value of Local Associations 141
By S. Harris

Report of Committee on Indians 146

Recommendation of Grant to Mr. Miner 147

National Organization for the Conservation and Protection of Wild Life 150

Death of Sir Wilfrid Laurier 156

Appendices:

I The Migratory Birds Convention Act 158

II The Northwest Game Act 165

Index 171

ILLUSTRATIONS

Facing page

Mountain Sheep, Vermilion Lake, near Banff, Alta..... 1
Rams on Sawback Range, near Banff, Alta..... 1
Head of Moose, taken in New Brunswick..... 16
Mule Deer, Rocky Mountains National Park, Banff, Alta..... 16
Young Antelope in Buffalo Park, Wainwright, Alta..... 32
Buffalo Bull, Rocky Mountains National Park, Banff, Alta..... 32
Young Live Beaver..... 48
Floods at Point Pelee, Ont., in the Spring of 1919..... 48
Herd of Elk in Buffalo Park, Wainwright, Alta..... 64
Elk in Buffalo Park, Wainwright, Alta..... 64
Antelope in Buffalo Park, Wainwright, Alta..... 72
Wild Geese on Premises of Mr. Jack Miner, Essex Co., Ont..... 80
Moss on which the Reindeer Live, Northern Saskatchewan..... 88
Peasemarsh Bird Sanctuary..... 88
Virginia Deer at Banff, Alta..... 104
Sheep on National Highway, near Banff, Alta..... 104
Grain-fed Three-year-old Buffalo, at Buffalo Park, Wainwright, Alta..... 128
Bull Moose, Buffalo Park, Wainwright, Alta..... 128
Elk in Buffalo Park, Wainwright, Alta..... 144
Rocky Mountain Sheep..... 152
Sheep at the Side of the National Highway, near Banff, Alta.... 152



MOUNTAIN SHEEP, VERMILION LAKE, NEAR BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan



RAMS ON SAWBACK RANGE, NEAR BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan

National Conference

ON

Conservation of Game, Fur-Bearing Animals and other Wild Life

Under the direction of the Commission of Conservation in Co-operation with the Advisory Board on Wild Life Protection

---

OTTAWA, FEBRUARY 18 and 19, 1919

THE Conference was called to order by Hon. Senator Edwards, Acting Chairman of the Commission of Conservation. The following members of the Commission were present:

Hon. A. E. Arsenault,
Dr. George Bryce,
Hon. Martin Burrell,
Mgr. C. P. Choquette,
Mr. J. F. MacKay,
Mr. C. A. McCool,
Hon. Arthur Meighen,
Dr. Howard Murray,
Hon. E. A. Smith,
Mr. W. F. Tye,
Hon. O. T. Daniels.

Also the following officials and representatives:

Nova Scotia—Mr. A. Knight, Chief Game Commissioner, Halifax, N.S.

New Brunswick—Dr. G. H. Prince, Provincial Forester, Fredericton, Mr. L. A. Gagnon, Chief Game Warden, Fredericton.

Quebec—Mr. J. A. Bellisle, Inspector General of Fisheries and Game, Quebec; Mr. E. T. D. Chambers, Special Officer; Mr. W. C. J. Hall, Superintendent, Provincial Parks.

Ontario—Mr. George H. Rapsey, Superintendent of Game and Fisheries, Toronto.

Manitoba—Mr. N. Criddle, Treesbank, Man.

Saskatchewan—Mr. F. Bradshaw, Provincial Game Guardian, Regina, Sask.

Alberta—Mr. Benjamin Lawton, Provincial Game Guardian, Edmonton, Alta.

British Columbia—Dr. A. R. Baker, Chairman, Provincial Game Conservation Board, Vancouver, B.C.; Mr. R. E. Hose, Chief Clerk of Board.

Yukon—Lieut. Col. A. Thompson, M.D., M.P.

Railways—Mr. A. O. Seymour, General Tourist Agent, Canadian Pacific Railway.

Game Protective and other Associations—Vancouver Angling and Game Association and Vancouver Game Club, Dr. A. R. Baker; Essex County (Ontario) Wild Life Conservation Association, Mr. Samuel Harris; Sudbury District (Ontario) Game and Fish Protective Association, Rev. T. J. Crowley, Dr. E. A. Hill, and Mr. R. S. Mitchell; Petawawa Camp Fish and Game Club, Mr. E. E. Lemieux; Province of Quebec Society for the Protection of Birds, Mrs. W. F. L. Dyer.

Press—Mr. W. J. Taylor, publisher of *Rod and Gun in Canada*.

Fur Companies—Mr. E. Mellon, Revillon Freres, Montreal.

Dominion Government—Members of the Advisory Board on Wild Life Protection: James White, Deputy Head and Assistant to Chairman, Commission of Conservation, and the Chairman of the Board; C. Gordon Hewitt, Dominion Entomologist, Dept. of Agriculture and the Secretary to the Board; Duncan C. Scott, Deputy Superintendent General of Indian Affairs; R. M. Anderson, Zoologist, Geological Survey; J. B. Harkin, Commissioner, Dominion Parks, Dept. of Interior.

United States Delegates—Mr. E. W. Nelson, Chief, Biological Survey, United States Department of Agriculture, Washington, D.C.; Dr. W. T. Hornaday, Director, New York Zoological Park; Mr. J. B. Burnham, President, American Game Protective Association ; Mr. Charles Sheldon, Washington, D.C.

Sir James Grant, Ottawa; Mr. F. H. Williamson, Dominion Parks Branch, Ottawa; J. M. Macoun, Biological Division, Geological Survey, Ottawa; Jack Miner, Kingsville, Ont; P. A. Taverner, Geological Survey, Ottawa; Dr. C. W. Wilson; Mr. Robson Black, Canadian Forestry Association, were also present.

Hon. Senator EDWARDS: We have with us this morning Hon. Arthur Meighen, Minister of the Interior. As the administration of the Northwest Game Act and the enabling Act making effective the provisions of the Migratory Bird Treaty has been placed under the

Dominion Parks Branch, one of the many branches of Mr. Meighen's department, it is fitting that Mr. Meighen should be with us and say a few words of welcome to those present.

Hon. ARTHUR MEIGHEN (Minister of the Interior): It is a rather unpretentious and, for that very reason, appropriate, introduction that Senator Edwards has given me in asking me to address you. I really have nothing in the way of an address to give, other than to say a few words to welcome the delegates to this conference.

Death of Sir Wilfrid Laurier

We, in Canada, are now under the shadow of a very great loss. A light has gone out from our midst, a very pure and flaming light. Throughout the four corners of our Dominion we feel the sense of something gone. I was taught almost at my mother's knee to set my mind and my life, so far as its public activities were concerned, against what Sir Wilfrid Laurier represented in this Dominion. It was not until well on toward middle life that I came in contact with him personally, but I soon found, as many thousands have found, that the predilections of earlier years had no justification, so far as his personal character was concerned. All in the nature of personal animosity melted in his presence, and one could scarcely resist the aspiration to become his friend. In the history of our country there are recorded many bitter political animosities, and it is not the least pronounced tribute to the worth of a man that he survived fifty years of political conflict and goes to his grave with the love and affection of vast multitudes of our people, and with the personal regard of all.

United States Delegates

I notice that we are to be favoured here with addresses on most appropriate subjects by distinguished men of the United States. It is worth noting in this connection that the great man who has just passed away in Canada was similar in one respect to the distinguished American, Theodore Roosevelt, who recently departed life over there. Sir Wilfrid Laurier, like Theodore Roosevelt, struggled in earlier years against a most unfortunate and menacing handicap. He travelled during ten years of his life on a very narrow isthmus between life and death, and only by the supreme power of will and work did he, like his great fellow-American, overcome that obstacle and make his life a great and immortal success.

This conference is called by the Commission of Conservation and the Advisory Board on Wild Life Protection. The Department of the Interior is especially interested in the conference, and, as the head of that department, it is indeed a privilege to me to welcome

you and to express the wish that some real and lasting fruits will result from your gathering together. Indeed, the very nature of the conference is such that good results should follow.

Wild Life a Great Resource

We have come to realize in the Dominion—late, it is true, because, as a nation, like all other nations, we have only realized very late the importance of great truths—that the conservation of our game is as vital a subject for consideration and attention as is the conservation of any other of our resources. The Dominion of Canada is so situated that wild game is a larger factor in the estimate of our national resources than it is, perhaps, in many great countries. A large section of this Dominion is valuable for its game and its fur-bearing resources more than for anything else—indeed, to the utter exclusion of anything else. That great stretch between the eastern coast of the Hudson bay and the Atlantic, on the one hand, and the Mackenzie basin, on the other, is valuable for its fur-bearing; in fact, as yet, it is valuable for little else. Canada is known as the great breeding place of the wild fowl on this continent. The Interior Department administers, as you know, the Northwest Game Act, which has been on our statute book for many years, and also the recent statute ratifying the convention with regard to migratory birds entered into between the British Empire and the United States.

A glimpse of the value of your work can be had by considering the loss that we annually sustain as an agricultural community through the depletion of our insectivorous birds. In Western Canada, as in Ontario and, no doubt, in Eastern Canada, the loss in this respect is very great indeed. The figures are so great that I hesitate to quote them; and a great service, from a purely commercial standpoint, can be rendered by a study of the best means of preserving our wild birds.

Fur-bearers of the North

Our fur-bearing resources are also very extensive in what are known as the 'barren lands' of northern Canada—but which are not in any real sense barren lands. I do not know whether Senator Edwards will agree with me in this, because he and I are at opposite poles on this question of Canadian resources. But they are not *barren* lands, because no barren land can sustain the animal and plant life that these lands sustain. In that district, therefore, there are tremendous possibilities of greater fur-bearing and, indeed, meat-bearing development. I think it was Seton Thompson who fixed the number of caribou of that country at very many millions, and that it was Mr. J. B. Tyrrell who referred to them as being like the sands of the sea, not capable of being numbered, but only to be estimated numerically

on a square-mile basis. It is impossible to conceive that we are not going to do something to extend the geography of Canada, so far as civilization and utilization are concerned, nearer to the Arctic, and make use of these vast domains which, while not comparable with the rest of the Dominion, will, if properly administered, become an exceedingly valuable asset among the natural resources of Canada.

I am glad indeed to find that such a distinguished gentleman as Dr. Hornaday, the Director of the New York Zoological Park, is to be among the contributors to the value of this conference, and also the gentleman who, on behalf of the United States, is responsible for the administration of the Migratory Bird Convention to which I have referred, Mr. Nelson. I earnestly hope that I shall be able to be present to hear what they have to say.

Wild Life and the Indians

There is another reason why I am interested in this conference. Not as Minister of the Interior, but because I am Minister of the Interior, I happen also to be Superintendent General of Indian Affairs. To the Indian, wild life is almost all of life. Possibly for many generations yet the Indian will not be able to subsist, to fight against the inroads of disease, and to maintain himself as a healthy and real Indian, except by access to sufficient wild life to enable him to so do. By reason of the depletion of deer and other game in the Ungava district—which depletion took place most pronouncedly some thirty-five years ago, at the time of the great fire—it is becoming increasingly difficult to sustain the life of the Eskimo and Indians of that territory. It is not that the Department of Indian Affairs is negligent of them, because direct assistance to the Eskimos and Indians has been on the increase during all these years. But such assistance can never take the place of that ability to help themselves which Indians alone can exercise if they are in the environment of wild life; consequently we are making an effort to re-establish the conditions under which the Indian and the Eskimo can survive by their own resources and their own energies. Help them as we will, the more we help them the faster they die. Tuberculosis invades their huts; they do not get out as much as they did; if we help them more they get out the less, and we are steering towards the extinction of the Indian and the Eskimo in that territory unless some successful change of policy can be made. It is not an easy matter in a country of such vast extent as ours to bring game into a territory of that kind and to preserve it through its earlier stages and enable it to become sufficiently numerous to be of real utility to the people. We are making arrangements that, we trust, in the course of time will take care of this condition, by co-operating with a concern which hopes very shortly to

bring Alaskan reindeer from the northern portions of Canada and thence across Hudson bay into Ungava peninsula.

I wish to express my appreciation of the calling of this conference, and to hope that the exchange of opinions and experiences and the deliberations generally of you who are assembled here will result in advancing the knowledge of every section of the matters you are called upon to consider, as well as what may be described as a really practical outcome—greater uniformity in wild life administration and in the laws relating to wild life, and tangible progress in furthering the preservation of wild life itself.

SENATOR EDWARDS: It is always interesting to hear Hon. Mr. Meighen, and I am sure you have listened to him with a great deal of pleasure. His tribute to Sir Wilfrid Laurier must be appreciated by every one, and particularly by his close friends. As one of Sir Wilfred's intimate close friends, I thank Mr. Meighen very much for the remarks which he has made.

I was very much interested in Mr. Meighen's remarks with regard to Ungava. I know that country, not personally, but by proxy; our firm has explored it. I may say that a good deal of the burning that is going on—at least, this was the case a few years ago, and I imagine the condition still exists—is done by the parties whom our friend Dr. Grenfell is helping to maintain there. His friends in that district are misguided, and he is making a great mistake—unintentionally, of course.

I shall now call upon Dr. Hewitt, Dominion Entomologist, Dept. of Agriculture, and Consulting Zoologist to the Commission of Conservation. Dr. Hewitt will address us on the Need of Nation-wide Effort in Wild Life Conservation.

DR. C. GORDON HEWITT: Before reading the few remarks which I have to make I should like to add a word of tribute to the words that were spoken at the Annual Meeting of the Commission of Conservation yesterday and to those that have been so well spoken by Hon. Mr. Meighen this morning, to the memory of Sir Wilfrid Laurier.

Sir Wilfrid Interested in Wild Life

It was pointed out yesterday that Sir Wilfrid Laurier was the chief man who was responsible for the creation of this Commission. But we are gathered here to consider a certain aspect of the Commission's work, namely, the conservation of wild life. It may not be known to most of you that Sir Wilfrid took a very keen interest in wild life. It was my privilege to be on terms of friendship with Sir Wilfrid, consequently I had many opportunities of learning of his great interest in wild life. Of course, public men in his position are generally regarded as politicians only; few trouble to think that there may be another

side to their lives. As a matter of fact, Sir Wilfrid had a very great love of nature, particularly of birds and trees. I never met him without the conversation turning to the subject of birds, or to the work that was being done by the various provinces and by the Dominion for the protection of birds. He took a great interest in our work here in Ottawa. The last communication I had with Sir Wilfrid was a letter from him, stating that he had written Sir Lomer Gouin asking his interest in the work that this Commission and the Advisory Board had undertaken to secure the reservation of the Bird rocks and Bonaventure island in the gulf of St. Lawrence as bird sanctuaries. During all the ten years that it was my privilege to know him, Sir Wilfrid evidenced a very real interest in wild life conservation, and it is fitting that this should be pointed out at a time when we are all thinking of what the nation owes him and the loss it has suffered at his death.

The Need of Nation-wide Effort in Wild Life Conservation

BY

C. Gordon Hewitt

Consulting Zoologist

THIS National Conference marks an epoch in the history of the movement for the conservation of wild life in the Dominion. Convoked, as it has been, by the Commission of Conservation, with the co-operation of the Advisory Board on Wild Life Protection, it represents the first occasion on which an endeavour has been made officially to bring together those who, through their official duties or public or private interests, are concerned in the protection of our game and fur-bearing animals and wild life generally. All to whom our wild life has any significance have been invited: officials of Dominion and Provincial Governments, representatives of sportsmen's and game protective associations, of the fur-trading companies and of the railways. And the international significance of the problem that we are to discuss is evidenced by the presence of those of our friends a ndco-workers from the United States who have accepted our invitation.

National Responsibility

During the last decade there has been in Canada an awakening to the fact that, of all our natural resources, the wild life was the most sensitive to human interference, and there has been a realization of the responsibility that rests upon our shoulders as trustees of the greater portion of what remains of the big game animals, of the breeding grounds of the wild fowl and of the most valuable fur-bearers of this continent. The manner in which the wild life over most of the United States has suffered through lack of adequate protection has furnished an object lesson that Canadians have not been slow to learn; and, while wanton destruction and excessive and unwise killing have taken place throughout Canada, our comparatively small population has not depleted our wild life so well favoured in haunts by Nature, and we are still fortunate in possessing a fair proportion of our original stock of game and fur-bearing animals, well distributed over the country. We have convened for the purpose of determining the best methods by which we can con-

serve our wild life for the use and enjoyment of the people of to-day and of the future.

Before we commence our discussions, I should like to emphasize two points, which are vitally important in their bearing on this subject, namely, the desirability of the greatest degree of co-operation, and the necessity of foresight.

Delay may mean Extermination

Taking the last point first, why should we not now resolve to use that faculty which distinguishes us from our fellow creatures and exercise our reason, which should make us provident? In the past it has been almost an invariable rule to wait until serious depletion of game animals has taken place before instituting protective measures which, had they been in effect earlier, would have prevented such depletion. Why should we continue to be so lacking in foresight, and of those attributes that make a nation progressive, as to be unwilling to provide against contingencies that we know from experience will occur? Conservation is practical foresight. No natural resource needs the application of greater foresight for its conservation than our wild life, for it cannot be replaced once it is destroyed, and its destruction can only be avoided by wise prevision. Let us, therefore, resolve to look ahead of the present requirements, and plan with our eyes on the future.

But the chief object of this conference is to secure as great a degree of co-operation as possible, in order to further the objects we all have in view. A significant change has taken place in our attitude towards wild life. Formerly, game laws were framed more with an eye to human advantage than for the benefit of the wild life. Our wild life resources were regarded as a convenient and easy source of revenue, and the issuing of game licenses was the principal function of the game officer; the same attitude of mind existed in regard to our forest resources, which were regarded as a valuable source of public revenue, in the shape of licenses and stumpage fees, and not as an economic asset requiring wise conservation. But, when the limits of the, so-called, 'inexhaustible' come within the range of our perception, then the instinct of self-preservation comes into play, and we hasten to make such amends as may be possible by endeavouring to save what remains. The true game officer to-day is more concerned in protecting such game as remains than in issuing licenses for its destruction, and, if we are to retain our game resources, their conservation must necessarily constitute the main function of the game officer; he must be truly a game guardian or warden.

This broader conception of the significance of our wild life and of our attitude towards it has, in turn, brought about a greater sense of our responsibility with regard to the future, and a realization of the fact that the conservation of wild life is not a matter which any one province, state or territory can undertake alone, but that its successful prosecution demands neighbourly co-operation and mutual assistance. The extent of our success in protecting our wild life will depend upon the degree of our co-operation.

Co-operation in Protection

In every sphere of activity the spirit of co-operation is growing; in industrial labour, agricultural production or international conduct, co-operation is replacing separate effort. Similarly, in conserving our wild life we are appreciating the necessity of co-operation. So long as our migratory birds were subject to excessive destruction during their winter sojourn in the south and their spring migration northward, our effort to protect them in their breeding grounds was likely to prove unsuccessful altruism; the conservation of these birds demanded international action, and now we are endeavouring by mutual co-operation to protect them. This conference will afford an opportunity of discussing the means whereby we may co-operate in this problem to the best advantage.

Indeed, there are few phases of wild life conservation which cannot be promoted with a much greater degree of success by mutual co-operation between governments than by individual effort. In the regulation of the fur trade, which we propose to discuss, the enforcement of the best laws that a government can devise may be seriously hampered by the limitations that provincial or national boundaries place upon the jurisdiction of such governments. The same difficulty is met where contiguous governments have different policies; for example, where a provincial government, such as that of Saskatchewan or New Brunswick, prohibits the sale of game, and an adjacent province permits it; the absence of uniformity in policy leads to infractions of the law and trouble in enforcing it. While it is too much to expect uniformity in all cases, it cannot be denied that a much greater degree of co-operation than exists at present can be secured, and we believe that the best mode of obtaining such co-operation is by such a conference as this.

Predatory Animals

The migratory tendencies of most forms of wild life annul the effect of provincial or national boundaries, and the results may be for good or for evil; a territory carrying on a wise protective policy with regard to its game or fur-bearing animals will bring about an overflow into the more depleted

contiguous areas; or an area in which an ineffectual policy for the control of predatory animals will serve as a source of supply to neighbouring territory. For good or for evil, contiguity has an effect on the wild life. In the control of predatory animals it is now obvious that complete success can only be obtained by co-operative effort.

Canada Protects its Wild Life

There is abroad in Canada an impression that the Dominion Government concerns itself little, if at all, with the actual protection of wild life. This impression may have been justified by apparent inactivity in former years: it is not justified to-day, and the proceedings of this conference afford confirmation of the fact. While the Dominion Government has left to the provinces the protection of the game, fur-bearing animals, and other wild life within their respective territories, it is nevertheless responsible for the protection of the wild life over an enormous portion of Canada, namely, the Northwest Territories, Yukon Territory, and in the Dominion parks. In order to carry out our national obligations with respect to the treaty with the United States for the protection of migratory birds, it has also assumed the guardianship of our migratory birds; this is being undertaken with the practical co-operation of the Provincial governments. The legislation governing these matters is administered by the Minister of the Interior. In order to supervise the enforcement of this legislation, and to advise on such matters affecting the conservation of wild life as might be referred to the Government, there was appointed, two years ago, on the recommendation of the Minister of the Interior, an Advisory Board on Wild Life Protection, which is composed of a representative from each of the departments concerned in wild life conservation, namely the Departments of the Interior, Agriculture, Mines (Geological Survey), and Indian Affairs, and the Commission of Conservation. The chief activities of this Advisory Board, up to the present, have been the drafting of the legislation under the Migratory Birds Treaty and the revision of the Northwest Game Act.

Migratory Bird Protection

The policy adopted in respect to the protection of migratory birds serves to illustrate two points that I should like to bring out: First, the possibilities in the way of co-operation between the Dominion and Provincial governments; and, second, the useful functions of our Advisory Board as an instrument for bringing about or facilitating co-operation between the Dominion and Provincial governments, inter-provincial or international co-operation, all of which, as we cannot insist too often, are

essential to any policy for conserving our Canadian wild life. In regard to the first of these points, the government's policy in the administration of the legislation carrying out the Migratory Birds treaty is to rely on the provincial governments, so far as may be possible, for the enforcement of the provisions of the treaty within their respective territories. With this end in view most of the Provincial governments have already amended their game laws to conform with the provisions of the treaty. Where assistance is necessary to secure the adequate enforcement of the regulations, it is intended to furnish such assistance; and where it may be necessary for the Dominion Government to enforce the regulations under the Migratory Birds Convention Act, owing to the failure of a Provincial government to do so, the Dominion Government will live up to its obligations under the treaty, which is by no means a 'scrap of paper', but the most far-reaching measure that has been yet put into operation for the preservation of our valuable bird life. A great responsibility rests upon the Dominion Government in this matter, inasmuch as it is solely responsible for the enforcement of the regulations in the Northwest Territories, which now constitute, perhaps, the chief breeding grounds of the greatest number of the migratory birds of this continent.

Revision of Northwest Game Act

It may not be out of place to discuss as briefly as possible the conservation of the game, fur-bearing animals and wild life of the Northwest Territories, on which subject I have addressed the Commission of Conservation at previous annual meetings. The Commission recommended the revision of the Northwest Game Act in 1916, and that revision was subsequently undertaken by the Advisory Board on Wild Life Protection, a new Act being passed in 1917. The new Northwest Game Act, and the Regulations passed thereunder, have two main features: First, the needs of the wild life in the Northwest Territories are more adequately satisfied; and, second, the fur resources receive a greater degree of protection by the institution of a licensing system for trappers and traders, thus providing a safeguard against exploitation by unscrupulous individuals or companies. The Canadian people generally fail to realize, chiefly because they lack the information upon which to form an opinion or do not give the subject a thought, what an immense economic asset the wild life, and particularly the fur-bearing animals, of the Northwest Territories constitute. Reliable statistics of the fur production of these vast territories are unavailable, and, in passing, may I say that we hope that one of the results of this conference will be the development of a scheme for securing reliable

statistics of one of the country's chief natural resources, the resource that first attracted the outside world to our shores. But it is safe to say, that millions of dollars worth of furs of the finest quality obtainable are exported annually from our Northwest Territories. Furs constitute the main available resource, and capturing fur-bearing animals is the occupation of practically the entire population of those territories at the present time.

Government Control of Northwest Fur Trade

In an address which I gave before the Commission of Conservation two years ago on the "Conservation of our Northern Fur Resources," I pointed out that the Danish Government administers the fur trade of Greenland as a government monopoly, and has thus been able to exercise a great degree of control, with a view to ensuring the conservation of the fur resources, and, what is of still more vital importance, the conservation of the health of the natives by protection from foreign traders. So far as I have been able to ascertain, this policy has met with success. Why should not a similar policy succeed when applied to our Northwest Territories? The policy of state ownership of public utilities has its adherents and opponents, but the state ownership of natural resources is not in the same category, and the state ownership of certain resources, such as forests, has undoubtedly proved successful, from both the point of view of conservation and of revenue. A discussion of this subject in these introductory remarks would be out of place and I have enlarged upon it elsewhere. It is desirable, however, that all who are interested in the conservation of our wild life, and particularly the fur-bearing and game animals, should consider the suggestion that these wild life resources in the Northwest Territories might be administered as a government monopoly, and for three reasons: First, as a means of securing adequate protection for these resources; second, as a source of revenue; and, third, in order to safeguard the native population, which is dependent upon and is the chief means of harvesting the crop.

Reservations and Sanctuaries

In addition to the protection of wild life in the Northwest Territories and Yukon and of migratory birds under the international treaty, the Dominion Government is actively conserving the wild life in another direction, namely, by the establishment of natural reservations under the Dominion Parks Act. The wild life in all the national parks is protected, and these parks comprise an area of nearly 9,000 square miles. But certain parks, such as the Wainwright Buffalo park, the Foremost Antelope reserve and Elk Island park, are maintained solely for the conservation of native mammals that would otherwise

have been exterminated. The Commissioner of Dominion Parks, who is also charged with the enforcement of the Northwest Game Act and Migratory Birds Convention Act, will, no doubt, give further details regarding these Dominion game and wild life reserves, when he opens the discussion on game sanctuaries, which is one of the subjects that it is desirable to consider at this conference.

In the establishment and maintenance of wild life or game reserves in Canada there are unlimited opportunities for co-operative action between the Dominion and Provincial governments. In fact, the reserves in the provinces of Manitoba, Saskatchewan and Alberta are co-operative in character, inasmuch as such reserves are chiefly established by the Provincial governments in Dominion forest reserves. We feel, however, that closer co-operation is both desirable and possible, particularly in the matter of the appointment of wardens for such reserves. A wild life reserve fails in its object to a very large extent unless it is adequately patrolled; there are law-breakers everywhere, both white and Indian, and, if a reserve lacks sufficient protection, it will be a reserve in little more than name. The wild life inhabitants of a reserve must receive protection, both from human enemies and from the predatory animals that will be attracted to such a district providing more abundant food.

Effects of Conservation on Natives

In the conservation of our wild life one of the chief factors we have to consider is the native, whether he be Indian or Eskimo. His attitude towards the subject is naturally different from ours, and he affords a problem that demands sympathetic treatment and careful consideration. The Deputy Minister of the Department of Indian Affairs is a member of our Advisory Board on Wild Life Protection, and, in consequence, it is possible for us to give the fullest consideration to questions arising out of the relations of natives to our wild life and to take such action as may be deemed necessary and advisable. As this question will be discussed during the present session of the conference it is unnecessary to say more in this introductory statement than to point out that it affords, perhaps more than any other question, opportunities for co-operation between the Dominion and Provincial governments, and one of our desires is that this meeting and our free discussion will result in a greater degree of mutual understanding and co-operation in dealing with the problem of the Indian in the future.

In the foregoing remarks, government activities in the conservation of wild life have been chiefly considered. But, unfortunately, governments are more apt to follow than to lead public opinion in

questions of this nature. Consequently, the creation of a strong public opinion on the necessity of conserving our wild life is essential. It is essential, not only from the point of view of promoting the ends we have in view, but also in order to carry out effectually such measures as may be established.

Educating Public Opinion

The Commission of Conservation has taken the lead in educating public opinion in Canada as to the importance of conserving our wild life resources and in promoting measures to effect such conservation. The work that has already been accomplished has only served to indicate how much greater an effort is necessary. The assistance of all organizations concerned in the protection of wild life is essential. In a country so rich in game animals, it is surprising how few associations there are of those interested in the protection of such animals. There are a few associations of sportsmen scattered through the Dominion, but how may of these ever endeavour actively to promote wild life conservation or exert themselves except when their immediate interests are involved? Such associations of sportsmen should become active centres of propaganda for wild life conservation, not confining themselves to merely selfish interests, but dealing with the subject in a broad, public-spirited manner. Further, we should like to see associations of persons interested in wild life conservation, both sportsmen and nature-lovers, organized throughout the country. The effect of such organizations would be incalculable. Not only would they serve to educate the public, but they would be able to assist the governments in the effectual enforcement of the game laws. Where we now have one game protective or sportsmen's association, there should be at least ten. The possibilities of mutual co-operation between such associations and the governments are indefinite. In no way could an endeavour to promote nation-wide effort in the conservation of wild life meet with greater success than through the assistance of such organizations of sportsmen, of guides and of nature-lovers—in a word, of all who are directly interested in the adoption and carrying out of all measures that have for their object the preservation of our wild life resources.

Need of Nation-wide Effort

Time will not permit a further review of the various directions in which our fur-bearing and game animals and wild life generally may be more successfully conserved by co-operative effort, not only between governments but between organizations and governments. The need of such nation-wide effort was never so pressing as it is to-day. We shall never again have such an excellent opportunity of attaining, by mutual

effort, the ends for which we are individually striving, as we have now. Everywhere ideas are in a state of flux, and the extent to which they crystallize out in forms that will promote the welfare of the country as a whole will depend upon the justice of the cause, the weight of public opinion behind it, and the prescience of our governments. A great responsibility rests upon those of us who are endeavouring to form and guide public opinion, and, at the same time, are called upon to advise on the conservation of this and other resources, but we can discharge our obligations with a greater degree of success if we work together with the same ends in view, and, instead of limiting our vision by regarding our problems as local, make our cause a national one.

Discussion

Dr. Hewitt: May I suggest that this paper is really not meant for discussion; it is intended as a general introduction to the work of the conference. Our programme has been purposely made brief, as we felt that the objects of the conference would be better attained if we had plenty of time for discussion of the subjects with which they deal rather than a large programme which would leave practically no time for discussion. You will see, therefore, that we have endeavoured to select subjects that seemed to us to need discussion by such a conference as this and, possibly, action by resolution.

On the other hand, delegates to the conference may wish to discuss subjects that are not on the programme. We had that also in view, and we welcome the discussion of any further questions which delegates to the conference desire to bring up during the course of the meeting.

Dr. A. R. Baker (Chairman, Provincial Game Conservation Board, Vancouver): Dr. Hewitt remarked that game wardens, instead of being sellers of game licenses should be game conservers. British Columbia has taken a forward step in the conservation of game by appointing a Game Conservation Board, whose sole duty it is to see that the game of that vast country is conserved as far as possible. It has always been the object of governments to derive as much revenue as possible from the sale of licenses and from the exportation of the skins of our fur-bearing animals. For many years I worked to get the British Columbia Government to bring about a system whereby we would have an opportunity of conserving our game and our fur-bearing animals.



HEAD OF MOOSE, TAKEN IN NEW BRUNSWICK



MULE DEER, ROCKY MOUNTAINS NATIONAL PARK, BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan

Dr. Hewitt spoke about the fur-bearing districts of the Northwest. British Columbia produces about one-third of the fur produced in Canada. We have established a system, under which we can give you exact figures of all the fur that is taken in the province and exported at any time. Mr. Hose, who is with me, will be pleased to explain the system and to give an idea of the amount of fur taken out yearly.

One year ago, the Game Conservation Board of British Columbia was created, of which I am proud to be chairman. During the short time that we have been in existence, we have accomplished wonderful results. I should like to see Conservation Boards and Game Protective Societies established in all the other provinces. In British Columbia two game protective associations have been established—one in the interior and one on the Pacific slope—comprised of representative sportsmen of the province. These associations have entered into the spirit of conservation and are doing a great deal of valuable work in preserving, protecting, and conserving game.

Hon. E. A. SMITH (Minister of Lands and Mines, New Brunswick): At the last session of our Legislature we passed what is known as the Forest Act. Formerly we employed a number of men, at a certain time of the year, to scale our logs. Then, a certain number of men were employed, during portions of the year, to protect our forest lands from fire, and we had another set of men temporarily employed for the conservation of our game, and known as game wardens. I do not think that any of these branches of work was carried on in the best interests of the province. The Forest Act, as passed last year, was coupled with the Forest Fires Act. Under the Forest Act we consolidated or combined those three outside services, and made the employees permanent instead of temporary. I do not think there was any saving of money; I did not take that into consideration. What I did take into consideration was chiefly the conservation of our game and our forests. In placing the Bill before the Legislature I contended that we did not get efficient service from our temporary employees, and that the appointment of permanent employees would give better results. Examinations of candidates were held, and no man was given a position who did not possess qualifications for the line of work in which he was to be employed; and, when selected for appointment, the first six months of his service was to be a probationary period. Lumbermen and others in the province are objecting to the new Act, but I feel that it was a forward step, and we are getting the results.

Restriction on Sale of Game

Last year I had the temerity to prohibit the sale of wild meat. I do not think the Eastern Provinces have really undertaken to ensure the conservation and preservation of our wild animals. However, owing to the high price of these meats, the pot-hunter was encouraged to violate the Game Act, and that is one of the reasons why I had this Act passed. I do not know whether we shall continue it or not. There is a great feeling against it; the poor people say they have always enjoyed their wild meat, and that what they did not eat they sold to their neighbours. However, if I cannot keep that Act on the statute book, it will not be my fault.

Relation of Indians to Wild Life Conservation

BY

DUNCAN CAMPBELL SCOTT

Deputy Superintendent General of Indian Affairs

IT would take a good deal of time to deal fully with all branches of the subject which you have allotted to me; therefore, I will only say something of what the Department of Indian Affairs is actually doing to conserve wild life by endeavouring to induce the Indians to obey the laws.

Sympathy for the Indian

We should have a good deal of sympathy for the Indian. He is the original fur-hunter of the country, and, when he was alone in that industry, he had everything his own way. When the fur-traders came, everything was changed, and, looking back over the old days, and reading records of that time, one cannot help wondering that any Indians now remain to hunt or to be subject to restrictive regulations, considering the stormy period they went through in their first relations with the white man. The Indians were then debauched by liquor supplied to them by government employees, military officers, and fur-traders, until the middle of the last century—1850 or thereabouts, when laws were enacted, providing that no more liquor should be given to Indians. Then a halcyon period for the Indian set in, when he could not get whiskey in trade, and when the fur-trade was in the hands of one or two great companies. The fur-bearing animals were carefully conserved by the companies and by the Indians themselves in their own interests. The number of skins to be taken was limited, and the trade was very carefully regulated. These conditions prevailed until the independent fur-trader made his appearance upon the scene. Now the trade is so divided and parcelled out between hunters, who are not Indians, and many companies and individuals who are engaged in buying furs, that the Indian finds it, year by year, increasingly difficult to support himself and make way amidst competition and the restrictive regulations which he is expected to recognize and obey.

63267—2½

Restrictive Legislation

The Provincial governments are attempting to deal with the fur-trade by enacting restrictive legislation, and the Department of Indian Affairs endeavours to induce the Indians to obey the Provincial laws. That is the fixed policy of the Department. As you are all well aware, we have what we call 'treaties' with the Indians. These treaties are really cessions of land, surrenders of large areas of Indian lands over which the Indians had usufructuary title. It has been British policy, ever since the year 1763, to require a surrender of these titles before the country was thrown open for settlement. In most of the treaties the question of hunting and fishing was mentioned. I will read the clause which is inserted in these treaties:—

"His Majesty further agrees with his said Indians, that they, the said Indians, shall have right to pursue their avocations of hunting and fishing throughout the tract surrendered as hereinbefore described, subject to such regulations as may from time to time be made by His Government of His Dominion of Canada, and saving and excepting such tracts as may from time to time be required or taken up for settlement, mining, lumbering, or other purposes, by His said Government of the Dominion of Canada, or by any of the subjects thereof fully authorized therefor by the said Government."

While allowing the Indians this privilege, these treaties, for the most part, contained the general provision that the Indians shall be loyal subjects of His Majesty and obey the laws passed from time to time by His Majesty's Government.

Indians under Provincial Law

The Indian Act contains no specific legislation on the subject of hunting and fishing, but contains the following clause, which controls he application to Indians of Provincial laws in Manitoba, Saskatche- wan, Alberta and the Northwest Territories:

"The Superintendent General may, from time to time, by public notice, declare that on and after a day therein named the laws respecting game in force in the Province of Manitoba, Saskatchewan, or Alberta, or the Territories, or respecting such game as is specified in such notice, shall apply to Indians within the said Province or Territories, as the case may be, or to Indians in such parts thereof as to him seems expedient."

From time to time, by proclamation, we have brought Indians under the provisions of the provincial game laws, and, through correspondence with our agents, and, through the exercise of all the influence we can bring to bear on the Indians themselves, we are endeavouring to get them consistently to obey these laws.

We have not had much trouble with the Provincial governments on the question of Indian hunting. Of course, we sometimes get exaggerated reports that the Indians are killing all the moose in certain districts, but, when we investigate them, we usually find that there is little foundation for the reports.

Indians Kill for Food

On the whole, it may be said that the Indian obeys the hunting and fishing regulations equally as well as the white man. The Indian, who has to maintain himself on his hunting grounds by killing animals for food, is entitled to a measure of sympathy, and we have found that the Provincial governments are willing to recognize his exceptional position in this regard. The Indians who are difficult to deal with are those who are remote from civilization, living in aboriginal conditions and not open to the influences of civilization; but this class is fast disappearing.

I repeat, Mr. Chairman, that, so far as the Department of Indian Affairs is concerned, our fixed policy is to endeavour to induce the Indians to obey the laws passed by the Provincial authorities for the conservation of wild life and the preservation of game, and to endeavour also to mitigate the laws to meet any special conditions that surround the present mode of life of the natives.

Discussion.

Mr. F. Bradshaw (Provincial Game Guardian, Saskatchewan): We have listened with interest to Mr. Scott's remarks, but I, for one, do not think that everything possible is being done to control the Indian. One of the most difficult problems we have to contend with in Saskatchewan is the non-observance of the game laws by Indians.

The Indian does little or no big game hunting during the lawful open season, but it is an established fact that, during August, September and October, when the moose and elk are easily lured within range by the use of a call, he kills far more big game than he is legally or morally entitled to. In the early days, when there was an abundance of wild life, no reasonable objection could be taken to the killing of big game for legitimate requirements, but, in these days, when the annual toll taken seriously endangers the very existence of some of the magnificent species of our North American fauna, I think we would be very remiss in our duties as wild life conservationists if we closed our eyes to the unwarranted violations that are being perpetrated by the Indians at this time.

I do not know whether this problem affects the whole of the Dominion or not, but I think I may safely say that it applies with equal significance to all the western provinces, and, for this reason, I presume the subject to be of sufficient importance to warrant my bringing it to the attention of this conference.

Each year our department receives an increased number of complaints of wanton slaughter of big game by Indians. These are usually received from settlers who reside in the vicinity of where the Indians are operating, or from sportsmen who go to considerable expense and trouble in preparing for their annual big game hunting trip, only to find, on arriving at their camp, unquestionable evidence that the Indians have preceded them. I suppose, in some cases, the complaints received are prompted by selfish motives; in others, the motive is purely a desire to secure a square deal both for the game and for the law-abiding sportsmen. Whatever the reason, the fact remains that, for the most part, the complaints are justified, and, in nearly all cases, they are fully substantiated upon investigation.

Perhaps, the best way to open up this subject for discussion would be to quote from a few of the many letters recently received by the department on this subject. But first of all, I will read a news clipping from the North Battleford *News*, dealing with the situation as it obtains north of that city:

"The slaughter of moose in the north country goes steadily and craftily on. This autumn has actually been the worst, positively the worst, in years. According to reports from those who know, and with whom *The News* is in close touch, fully two hundred moose were uselessly slaughtered by the Indians in the country to the north of us during the season just closed. Hunters who have lately returned from the moose-hunting grounds of the north emphatically state that the hunting this year was the dullest yet experienced. Few traces of moose could be found. For days the forests could be scoured for these monarchs of the woods without success. Indian encampments could, however, be seen in plenty, profusely decked for rods around with moose heads, hair, and hides, proving beyond any doubt that, throughout the summer and early autumn, the country was stripped clean by these marauders of the animals that should be only killed off sparsely by legitimate hunters annually. This wanton slaughter, the work of Indians from across the border to a large extent, is the talk of the whole country, and much resentment is felt at the condition of affairs existing.

"The Provincial Government should investigate the affair at once, and, hereafter, appoint a game warden to preserve the game of this last great moose rendezvous of this portion of the West."

The reference to Indians from across the border would indicate that natives from the south are now making an annual excursion to

our big game hunting grounds, and we are informed from another source that a large band of half-breeds from Montana visited our northern woods last summer and feasted on moose meat during their sojourn, and then returned with what they considered enough dried meat to carry them through the winter. So pleased were they with the success of their trip, that it is stated, they contemplate a return visit next summer.

While the accuracy of the figures contained in the below letter might be questioned, it will suffice to show the views of a sportsman whom, I would judge, from my own personal knowledge of him, can at least be credited with sincerity of purpose and an enthusiastic desire to further any project that has for its object the conservation of wild life. This is part of his letter:

"While I had almost decided never again to say much with regard to the big game conditions, I again feel that it is my duty to tell you some of the conditions which exist there, and how imperative it is that thorough and drastic measures be taken immediately in order to preserve the game of our big game fields, not from licensed hunters, but from Indians and those who kill for commercial purposes.

"Two years ago I was over very much the same ground as I was this year. That year I saw 157 head. Each and every member of our party saw a large number of animals, these being principally cows. This year, with cows and all, I saw only eight head, putting in a week extra over what I did the previous year. I am reliably informed that one party of Indians alone killed 127 head of elk during the month of September. While it is hard to prove these things, there is not the slightest doubt in my mind but what this is done. This, as you know, is the rutting season, or calling season, and it is no trouble whatever for any one to go in and kill and kill and kill without effort, and the evidence of this slaughter can be found in many places. Some of the finest heads, that would be considered almost priceless, are slaughtered and left to rot. That these Indians may, in a sense, use this meat for food, I do not doubt, but, in view of your intending to close the season on elk for three years, I might say that, under the conditions which exist at present, you may as well throw the season wide open and let the white get his share of the game with the Indian, for, if you close this season for three years, you only close it against a few of your licensed hunters who have to go over a railway. The Indian and he who wishes to commercialize in game are not affected in the least, and I daresay, under the present conditions, that, although you may close the season, within three years from now there will be no elk on the big game fields of the north to be secured by any one.

"I never in all my life saw such a slaughtering of game in two years as has taken place in the elk fields north of Prince Albert; and, on the other hand, I feel that, if the Government does owe a just debt to her returned soldiers (of whom many are our most loyal

sportsmen), it is to the preservation of these game-fields that they may be again able to enjoy a little hunting after their return, as these men are surely entitled to every consideration. I am absolutely convinced that the licensed, legitimate hunters are not, to-day, depleting your game-fields of the north. . . . I again state that, if you wish to preserve the big-game fields of the north, it is necessary to put on more patrolmen, enforce the law more rigidly, and stop the illegal killing in September and October, as it is the market-hunter and the Indian who are depleting the game of the north."

The two letters I will now read give a very clear insight into the methods pursued by the Indians. The first is from a man at Unity, Sask., and is as follows:

"I do not wish to make a complaint against any one responsible for the enforcing of the game laws, as, with the great area of the province, it would require a force large in number and of the right stamp to strictly enforce the laws. But, if we are to have big game in the years to come, we must have three or four resident game wardens right in amongst the game to watch Charley Grey-eyes and Johnny Rain-in-the-face.

"It does seem pretty hard, when everything is so high in price, to think the Indian has a source of revenue right at his door and we will try to deny him. But he is preparing himself for a period of game scarcity if his present methods are not stopped. During my four trips to the big game country we found only one spot which lacked the marks of the Indians' visit. That was Tp. 57, Rge. 15, and in the season of 1915. We went in on an old surveyor's trail, and cleaned out windfalls, etc., for several miles, and there was game to repay us for our labour. The next season, we took the same trail, but the Indian appreciated our efforts at road-making, for he spent a good part of the summer of 1916 right on our old camp grounds and left his drying-racks and piles of moose hair as evidence that the game was plentiful in the summer at least. We had to hunt hard that autumn to get a moose, and decided to try a new spot in 1917. This lay by way of the Green Lake trail, and we got into a nice run of game, despite the fact that Indian signs were plentiful. During 1918, we went to the same grounds, and I was sorry to see the destruction which the Indians had wrought during the previous summer. The drying-racks still had the leaves on them, showing that they were cut when poplar was in full leaf, and we judged the date to be not later than August. We made careful examination of the many camps, and found skulls of cows, calves, and bull moose, as well as does, fawns, and bucks of the jumping deer. I venture to say the Indians killed more game illegally in 1918 than all the licensed hunters saw during the big game season."

Here is another one:

"I hunted moose this fall in Tp. 56, Rge. 16, W. 3rd Mer., and, I am sorry to say, found no moose, although they were very plentiful last autumn. But I did not have to look very far to find

the reason. The Indians had been there before us. While up there I saw several hunters, and all were complaining of the same thing. I saw six Indian camps in Tp. 56, one in Tp. 55, and one in Tp. 57, and pack trails and wagon roads were in evidence everywhere. Some of the camps had eight stretching racks, and moose hair four inches deep lying around them, also several cow moose heads. They must have been there in the summer, as the trees they had used for shading their camps had dried leaves on them, and were mostly alder and poplar. I heard one report of an Indian saying they killed 200 between Meeting and Witchekan lakes, and I should not be surprised if evidence to that effect could not be found in the way of buckskin in either of the Witchekan Lake stores."

In that connection, we made an investigation, found that such was the case, and the storekeepers were heavily fined. The letter continues:

"I think it is up to the game department to go after the Indians and put a stop to the killing of moose for their hides. I am afraid if the Indians had been there when we were, they would have had a rough time."

Here are two letters from settlers whose chief grievance seems to be that the Indian is obtaining undue advantage over the white man:

"I would ask a few questions regarding the killing of big game in the province of Saskatchewan. Is it lawful for the Indians to come in from their reserves and kill moose out of season?

"For the last two years they have just about succeeded in clearing the surrounding country of all big game. Some of the farmers are asking: Is there one law for Indians and another for the white man?

"Not that we want to see the Indians go hungry, but we do not like to see parts of moose and jumping deer lie rotting in the bush, which has occurred. And not only this, but they have the presumption to come around on *Sunday* selling this meat from door to door.

"If the Government sees fit to allow these Indians to obtain food in this way, all well and good; but some of the residents and farmers are under the impression they are doing more than the Indians towards opening up the country and advancing civilization. This may not be a democratic spirit towards the red man, but, if the deer are to be wasted, we would like a small share to help lessen the high cost of living, but we dare not.

"Sir, we are not hunting trouble for the poor Indian, far from it. But is it justice?

"I would be very much pleased to hear from you on this matter, as a moose has just been slaughtered not half a mile from here."

This is the other letter:

"All last winter and most of the summer of 1918 a lot of Indians in this settlement were killing moose and deer and selling as much of it

as they could; then, about October, 1918, about fifty Indians came in to hunt before the season opened; while, if we, who are doing something for the upbuilding of the country, should kill game out of season for our own use, we are liable to a heavy fine. The Indians seem to have a special privilege to kill and sell as much as they wish.

"At present a lot of Indians are camped here, are killing moose and deer and selling same.

"I ask that you use your influence and, if possible, have the Indians removed from here at once, and not permit them a privilege that we do not enjoy."

The next one is from an old-timer, whose opinion on these matters is highly respected. It gives some idea of the destruction that it is possible for a single Indian to execute, and, when we consider there are hundreds; yes, I think it would be no exaggeration to say thousands, of such Indians engaged in similar destruction throughout the length and breadth of this Dominion, we may form some idea of the tremendous slaughter that takes place annually as a result of this unlawful practice. Here is the letter:

"One of our business men was hunting north of Fort a-la-Corne this autumn, and had no luck; a large party of half-breeds were camped close to him. He joined them often at the camp fire, and, naturally, game was discussed. The remark was made that if the game were protected from Indians it would be more to the point, and an instance was quoted where an a-la-Corne Indian named Britain had killed 30 moose that autumn before the season opened. It might be difficult to verify this, but I have no doubt of its truth myself, as the Britain (or Poonaman) family are noted hunters.

"I was at St. Brieux for a week since the New Year, and was then credibly informed that Indians from Batoche and Duck Lake make a point of coming down just before the season opens and cleaning up the game in the Basin Lake country, where I do not think any of the parties I issued licenses to secured any last autumn.

"I knew you would be interested in this matter; it is an old fight, and I have had correspondence with both Dominion and Provincial Governments over it in the past. There is no doubt in my mind that Indians should only be allowed to kill game in season. Talk about them being hungry, they always are; what would keep a family of white people all winter in the way of venison would not last them a week, as they eat steadily until the supply is finished."

I might cite innumerable instances of similar charges against the Indian, but I think enough has been said to establish the fact that he is a real menace to the big game, and that the operations of the Big Chief Company are contrary to the most elementary principles of economy and conservation. As a matter of justice to law-abiding citizens; as a matter of protection to the game; and as a matter of insurance for the future welfare of the Indian himself, this

unlawful practice must be checked, or there can be but one result, the annihilation of the big game in all the districts affected.

From time to time, we have sought the assistance of the Indian Department in our endeavours to curtail this wanton slaughter. Our correspondence has always been courteously acknowledged, and promises of co-operation were repeatedly given. I regret to say, however, that there is little or no evidence of any improvement. I may be wrong, but the attitude of the Indian Department seems to be, that, while they are extremely sorry that such things are happening—the poor Indian must be fed, and, presumably, in the cheapest possible manner. I venture to say, that the average Indian agent encourages, rather than discourages, the illegal killing of big game. He feels it incumbent upon himself to keep expenses down to a minimum; in fact, I have reason to believe that this is expected of him, that he may present a report that is favourable to the Administration in regard to its avowed policy of making the Indian self-sustaining, so far as it is possible to do so. Consequently, the more moose meat the Indian secures the less beef the agent will have to provide. We do not deny the Indian's right to be fed, but he has the opportunity of securing an ample supply of meat during the lawful open season. If he fails to avail himself of this opportunity, the Federal Government, as guardian of the Indian, should assume the responsibility of providing the necessary food supply.

Notwithstanding the many complaints we receive of the Indian's depredations, there is still displayed an unmistakeable trace of sympathy for the Indian by most complainants, a sympathy, I think, which in a greater or less degree is found in every person who recognizes the red man's former privileges, and his present day improvidence. Nevertheless, none of these things should be allowed to blind us to the inevitable results of slaughter-house methods when applied to the killing of big game. If the Indian Department has no control over the Indians in this respect—a condition of affairs which I am not prepared to accept—there seems to be but one other solution of this problem, and that is the vigorous enforcement of the game laws, a policy which we would be reluctant to adopt, if we could find any way of avoiding it. However, I am firmly convinced that, under present conditions, it is absolutely necessary that stringent measures be taken if we intend to stamp out this evil. No doubt there are many representatives of the other provinces here who have a similar problem on their hands, and a full discussion on this important question would doubtless be the means of formulating some practical

plan that would help to bring about a solution of this perplexing problem.

Mr. D. C. Scott: I think the speaker should describe what Saskatchewan is doing by way of having her responsible game wardens look after this matter. The responsibility for the enforcement of the law rests upon the province; the Indian Department can do nothing about that.

Mr. Bradshaw: I am pleased to answer that question. At present we have four salaried game guardians, and provision has been made in our estimates for the appointment of five or six additional game guardians to enforce the game laws in connection with the Indians. I should like to ask Mr. Scott a question. Is the Indian Department in sympathy with the enforcement of our Provincial laws?

Mr. Scott: Yes, decidedly; and it always has been.

Mr. Bradshaw: Well, I have never seen any effect of it.

Mr. Scott: We took the necessary action under the Act to apply the game laws to the Indians. But our men cannot enforce the game laws. The Indians of Witchekan lake, for example, are 'wild'; they have not signed a treaty; we have, as yet, no official connection with them. As for the bands of roving halfbreeds from the south, it seems extraordinary that Saskatchewan can not stop them from coming in. You should know when they come over; they should be stopped at the border.

Mr. Bradshaw: We have only just received the information.

Mr. Scott: This subject should not be discussed in a controversial way. We wish to preserve the game; at the same time, we wish to have our Indians well fed, but we do not want the hunters to feed themselves entirely on the game of the country. It is difficult for us to control Indians that we do not come in contact with officially, such as the Witchekan Lake band, but they will, no doubt, settle down before long. Of course, they ought to be brought to time.

Mr. Jack Miner: We are met here to discuss these matters in a friendly way, and to bring about better game protection. If I know of something that I believe is wrong, it is my duty to stand up here and say so. The Kingsville, Ont., hunting party has hunted in the country 50 to 75 miles west of Sudbury. The members of our hunting party all took out licenses and some of them started trapping a few beaver. They just took the old ones—some of us knew how to catch the old beaver and let the younger ones go, and we showed the others how to do it. They got a few beaver, but I do not think

one of the party ever thought of selling a beaver skin. But this year, when we went up there, the Indians had come in and were camping right where I had camped for twelve or thirteen years—two brothers and a son—and they had three dogs. And of all the destruction! What is the result? Our party has to go to a new hunting ground. I will give the Indians their due: if we had a trap set they did not let that dam out. But they let the other dams out and they destroyed the beaver. I was writing a letter for an old Indian to his son in France, and among other things he said: "Tell him one hundred and fifty." I said "One hundred and fifty what?" "Well," he said, "he know what that is." I went to the Indian camp. The squaws were skinning the beaver. Some of them were thrown out; you never saw such a slaughter of our game. I went to the Indian one Sunday morning, and I said: "I have been hunting here now thirteen or fourteen years. You should not let those dams out and destroy the beaver in this way. I am not a game warden; I am your friend, but you should not do this." He said: "I kill him all; none get away." He commenced to show signs of anger, and I changed the subject. We found eleven sets of beaver entrails where they had let out two dams. I questioned this Indian and found that, originally, he had come from James bay. He knew the Indians at Hudson bay and James bay who were getting the tags off my wild geese. There was a game warden with us, and I think he reported this Indian. I did not report him; I would not invite him into my tent and talk it over with him and then report him. I had a talk with the game warden about this affair, and he told me that his sympathy was with the Indians. Every word he spoke made me feel as if some one was throwing ice water on me. He said: "My sympathy is with the Indian in every respect; they are starved out. Do you know the treaty the Government has with the Indians? Did you ever read it?" I said "No." "Well, he said, "before you go further I would advise you to read it." The game warden told me that if I did what the Indian had done, he would prosecute me—and I would respect him for it if he prosecuted me a dozen times. Can we do anything to stop this thing? A young Indian told me that he got $10 a quarter for moose meat. We find deer heads in the woods that have been taken the year before, with no horns on them.

Mr. E. T. D. CHAMBERS (Quebec): Had I known that this matter was to come before the meeting, I could have interested you fully as much as representatives of the other provinces have by reading correspondence showing the terrible depredations made by Indians

in the province of Quebec, expecially in the Abitibi country, a little to the south of lake Abitibi, and in the Gaspe district. I assisted in a prosecution a few years ago of some of these Indians in the Gaspe district, on the shores of the Bonaventure river. There, the slaughter was simply dreadful. The Indians were slaughtering the animals, taking away the meat for food, and leaving the heads to rot in the bush—in other localities taking away only the heads. There is no doubt that the destruction by Indians of wild game in portions of our province is terrible, and, in that respect, I endorse some of the things that have been stated by representatives from the other provinces.

Dr. A. R. Baker (British Columbia): I am sure it was with a great deal of interest that we listened to the remarks of Mr. Bradshaw, from Saskatchewan. Everything that he said with regard to the Indians is absolutely correct, and it applies equally to British Columbia. We have more difficulty with Indians than with anybody else. In the northern country, Atlin and Cassiar, we have experienced a great deal of trouble with the Indians in the slaughtering of moose. When they go on a trip they slaughter one every day for their dogs; they never think of carrying any. We have proof positive that, on a four-day trip through that district, two Indians slaughtered thirty-two moose. In the Chilcotin country, where there is a tribe of Indians on the Fraser river, they have slaughtered the Rocky Mountain sheep. They gather together at certain times of the year and have potlatches. They organize what is known as a 'drive'—they surround a mountain, drive all the game to the top, and simply slaughter it and let it lie there; they do not even take the hides away. They kill them just for the love of killing. The only way we have been able to do anything with the Indian is to segregate the areas where the game is plentiful into organized districts. Once we form an organized district the Indian must take out a gun license, same as anybody else; then we have some control over him. In the unorganized districts they are allowed to shoot under the Game Act, or allowed to kill for meat; but it is a well-known fact that the Indian on the Pacific coast and through the valley of the Fraser kills the animals simply for the love of killing—not even for their hides.

Destruction of beaver dams is another thing we have to contend with. The Indians take the beaver in the northern country by destroying the dams. Fortunately, streams are plentiful, and where the dams are destroyed the few beaver that escape migrate to other streams.

I am not criticising the Indian Department, more than to say this: When a district is organized, an Indian must take out a license or must get a permit to hunt, and the Indian agents apply for too many permits for the Indians. At the last meeting of the Conservation Board we decided that we simply would not give the Indians permits; they will have to take out licenses. We made recommendations to the Government for the organization of certain game districts, that we may put our own game wardens in and control the Indians.

We have a great deal of sympathy for the Indians and have no objection to their killing all the animals they need for their own use; but we do object to absolutely wanton destruction. Four years ago I went into a section of the Lillooet district for bighorn, or what are known as Rocky Mountain sheep, and on that trip I counted 50 rams. I went in there over a year ago, and could find only eight sheep left in that district. We are putting that area into a reservation. These animals were destroyed by the Chilcotin Indians. The year before last they organized a deer drive in the Lillooet district. We did not have a Game Commission at that time, but I made it my business to go into that country to get some information about that deer drive. I found that the Indians killed on that occasion alone something like 150 deer. If this thing goes on it will be only a question of time when the big game of British Columbia, Saskatchewan and Alberta will be a thing of the past.

Senator EDWARDS: We have now heard a good deal about the Indian as a destructive agency; perhaps we might have an expression of opinion on the constructive end of it. I think I am correct in saying that, some years ago, New Brunswick was almost denuded of its moose, but that, through the enforcement of proper regulations for some years, moose are again numerous in that province. Perhaps we might hear from some gentleman from New Brunswick on that question. Further, the beaver had almost disappeared from Algonquin park in Ontario; now they are very numerous, the Government having prohibited the taking of beaver. So we have evidence in two provinces of what conservation can do; we should like to hear from other provinces on that point.

Dr. HEWITT: It is, of course, quite to be expected that the various delegates will have complaints to make, and the object of this conference is to hear those complaints. But we are not going to get ahead if we do nothing more than hear complaints. What we really want is, not only accounts of destruction, but suggestions regarding conservation. I have no doubt that Dr. Baker, Mr. Bradshaw, and others, who complain of the great destruction caused by

Indians, have ideas of their own as to what should be done to abolish that. I suggest, therefore, that future speakers on the subject bear that in mind; together with their criticisms we would like to hear some useful suggestions as to how to deal with these difficulties.

Mr. D. C. Scott: Dr. Hewitt's suggestion is certainly very much to the point. While the Indian has been blamed, as well as the Indian Department, I wish to say that our policy is to support the provincial authorities in the conservation of game, and anything we can do through your agents to assist, we shall do energetically. If the provincial delegates can make any suggestions at any time as to action that might be taken by the Indian Department we shall be delighted to co-operate. Of course, the law-making power is in the hands of the provinces, as well as the enforcement of the law. But the Indian Department will do what it can, through its officials, by way of advice or otherwise, to put a stop to these illegal practices, which, of course, we deplore as much as anybody.

Mr. G. H. Rapsey (Superintendent of Game and Fisheries, Ontario): On behalf of Ontario, I wish to thank Mr. Scott for the co-operation of his Department with the Department of Game and Fisheries of my province. I have no adverse criticism to offer, so far as Ontario is concerned; the Department of Indian Affairs gives us every assistance.

Mr. Scott: I thank you very much—but we have not assisted you more than we have the other provinces.

Mr. Rapsey: Mr. Chairman, I wish to express my thanks for the kind invitation I received to attend this conference. I only regret that Mr. McDonald, the Deputy Minister, who, until the last moment, had intended to come, found it impossible to get away, and asked me to attend in his stead. I am not prepared, therefore, to give you an address; in fact, I hardly knew what was to come before the meeting until I received the programme this morning. I am greatly interested, however, in hearing from the other provinces and being informed somewhat fully of their difficulties. I realize that the Indian problem is a great one, and that the Indians are causing a great deal of destruction. But the Indians are not alone to blame. In Ontario a good deal of destruction is due to the white man, particularly in the northern part of the province, where lumbering operations are being carried on. There, a common practice is to engage men by the month to go out and shoot big game for the camp table.

Hon. E. A. Smith: I think that in New Brunswick the big game has been really on the increase; there is no particular scarcity in the



YOUNG ANTELOPE IN BUFFALO PARK, WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch



BUFFALO BULL, ROCKY MOUNTAINS NATIONAL PARK, BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan

province to-day. We have no Indians to speak of, and the few we have are no menace to the big game, for they are too lazy to hunt. I have never heard of any depredation or violations of the law by the Indians of New Brunswick. We have increased not only the big game of our province, but also the beaver. For years, we prohibited the killing of beaver, and the results have been so effective that, during the last three or four years, we have allowed killing under permit from the Department of Lands and Mines. We receive quite a revenue from our beaver permits; those who take them out have to pay two dollars per beaver killed. I would be very much in favour of the fur business being handled by the Provincial Government. Instead of selling permits, we should do the killing ourselves, thus doing away with the violations of the law which now take place.

Some two years ago we received a letter from the Dominion Food Controller, asking if we would allow the killing of some 2,000 deer. My answer was that we had not the deer to spare. I believe that to have consented to do so would have amounted to the extermination of our moose and deer. I am sure that you would like to hear from our Chief Game Warden, who will be able to give you a good deal of information.

Mr. L. A. GAGNON (Chief Game Warden, New Brunswick): Under the energetic direction of our Minister of Lands and Mines, we have now on our statute book a very good game law. We have about 45 temporary game wardens on duty, who are doing good work, in co-operation with the forest rangers, who are also charged with the protection of game. I think I am safe in saying that, during the past year, the game in our province has been better protected than for many years. As evidence of that, it has been observed that lumbermen are taking much more domestic meat to their camps this winter than formerly.

I am not quite satisfied with the regulations respecting beaver that we have now, but we will improve them before long. Under those regulations some abuse is made of the use of permits granted by the Department. However, our beaver have increased considerably during the last few years. With respect to our big game, the deer are certainly on the increase. From the information at hand, the moose is also on the increase; if not, it is undoubtedly holding its own. I do not know that we ever had any trouble with respect to the Indians. They are few in numbers, and they are subject to the game laws the same as white men; so far as I know, they have observed the game laws even better than the white men. Our trouble there is entirely with white men. I am absolutely in sym-

pathy with the men from the West, particularly the representative from Saskatchewan, who stated his troubles in connection with the Indians in so able a manner. While people sympathize with the Indians to some extent, it is not right to give them a monopoly of the big game, and it is my opinion that something should be done to straighten out that matter.

Mr. J. A. KNIGHT (Chief Game Commissioner, Nova Scotia): The Indian is not a great issue with us; some of them are engaged in a small way in agricultural pursuits and work in the lumber woods during the winter season. Few of them depend to any extent upon hunting for a livelihood. We sometimes have trouble with them, particularly with regard to beaver. They kill the beaver, and it is not easy to discover the offenders. But the Indians do not market the furs outside the province; and so would not kill them off if they did not have the assistance of white men. Let me give you an illustration. For several years we have had a close season for beaver in Nova Scotia, with a view to restoring them. A fur-buyer in Nova Scotia shipped some beaver skins to St. Louis, Mo., a month or so ago, but the St. Louis fur-buyer refused to handle them. That is an illustration of the benefit of co-operation in game protection. The St. Louis fur-buyer telegraphed the Nova Scotia man that he would not handle the skins, and the latter, realizing that he was caught, went to our game inspector and made a clean breast of the matter.

The Indians are hard to deal with in the matter of trapping beaver, because it would take an army of game wardens to watch them. It is easier, perhaps, to put a stronger check on the fur-buyer, and, in that way, prevent the killing of the beaver.

Game protection is not a new thing in Nova Scotia. It must be nearly 150 years since we passed our first migratory bird law. Dr. Hewitt referred to the importance of game societies as agents for game protection. In Nova Scotia we have what I think is, with one exception, the oldest game society in North America, the Nova Scotia Inland Game and Fishery Protection Association. The first one established in America still exists, I believe, in the state of New York. For many years the Nova Scotia Game Society were the chief agency of game protection in our province. They received a government grant and administered and enforced the laws. They received the license revenue, or the greater part of it, and used it for the purposes of their society. Recently, we organized a game commission. Dr. Baker spoke of the newly-organized Game Conservation Board of British Columbia; I am not sure that Nova Scotia was not the first province to introduce that method of game protec-

tion. I do not know that we spend as much on game protection as most of the other provinces, but there is one thing about game protection in Nova Scotia: it has never been in politics. When the management of game protection was taken out of the hands of that society, in order to bring it up to date and introduce more modern methods, it was placed under the operation, not of a department of the Government, but of a commission appointed for the purpose.

Some kinds of game are, of course, more difficult to protect than others. Migratory birds are among the most difficult, because, whatever we may do within our own province, we cannot protect them outside. Fur-bearing animals are also difficult to protect, as they are an important article of commerce. But some of our game, at all events, has increased in recent years. I am sure we have more moose in Nova Scotia to-day than we had ten years ago, and probably as many as we have had at any time during the last fifty years. We have more deer than we ever had. We have a few caribou on the mainland of the province, but they are of a migratory nature, and I think they must have left the province and gone north to New Brunswick and Quebec. There are a few traces of caribou on the mainland. Although we have protected them for a good many years, they have not increased there. But on Cape Breton island there is a tableland similar to the caribou barrens of Newfoundland. It is suitable for caribou, and, if they are not increasing in that district, at all events, they are holding their own. They are not hunted a great deal. The place is not very accessible to outsiders, and the natives, who live chiefly in the fishing settlements around the coast, are busy in the autumn with their farming and fishing. The chief killing is done in the winter by trappers—out of season, of course. But they are not being destroyed, owing to their peculiar situation. They are on the extreme northern end of the province, and cannot migrate without coming down through the more settled parts of the island and crossing the strait of Canso. The probability is, therefore, that, with a reasonable amount of protection, we shall have caribou there indefinitely.

Our position in Nova Scotia in respect to migratory birds is also a peculiar one. I am not sure that the wild geese winter anywhere else in Canada than on the southern shore of Nova Scotia. The wild geese that winter there are said to be somewhat different from and of a larger size than the wild geese from the south. We have set apart a section there as a refuge or feeding ground, and the wild geese are not decreasing. The people on the coast where the geese winter think there should be some change in the regulations to suit the

peculiar conditions prevailing there. If some change were made, of course, it could be confined to the particular counties where the wild geese winter.

Mr. J. M. MACOUN: I should like to make a suggestion with regard to dealing with the Indians, and that is, that the law be enforced with regard to the Indian as well as to the white man. The Indian likes as little as the white man to go to jail, and anyone who has been in northern Saskatchewan knows that a small party could detect the Indians who are killing deer or moose in contravention of the game laws, as the routes are well known by water and trail. A volunteer party might go after them. My experience has been that sympathy is generally with the game killer, whether he be Indian or white man. I know British Columbia well, but nowhere in that province have I seen any attempt to enforce the game laws. I have spent the last five summers in British Columbia, and, while I do not mean that the law is not enforced anywhere, I have seen it violated in every part of the province that I have been in during that period.

I know a case where, at a general boarding house in a lumber camp, near La Tuque, Que., moose meat was served at every meal. Everybody knew that; the resident game warden must have known that. I was in Mr. Bradshaw's province, ten years ago this autumn, a month before the moose season opened. My work took me to the lumber camps, and I was told that the lumbermen were living on moose meat. I know the sectionmen were, because my work kept me along the line of the Canadian Northern Ry., and I have eaten moose meat myself at the section-houses at practically every meal. Just when I was leaving that district, two days before the season opened, a young man who was with me wanted a moose-head. I knew the game warden, and I asked him if he could get a moose-head for my friend after the opening of the season and ship it down to me. He said that he could, and when I asked him how much he wanted for it, he said "Fifty dollars." I said, "If you send the moose-head to me I will send you the money". He said: "Have you the money with you?" When I replied that I had, he said "I will give you the moose-head right now." That was two days before the moose season opened. I do not mean to say that the chief game wardens are not doing their duty. But, in the Lillooet country, three years ago, I was within fifty yards of the place where a deer was killed—not by an Indian—and, if I had come along the next day with the game warden, he would have said: "Oh, those damn Indians again."

I was on one of the islands in the strait of Georgia the summer before last. Two bands of fishermen were there, one a large Indian

family and the other a band of four or five white men and a woman. The Indians lived on seal meat and fish; the white people lived on deer meat. I went to the camp of the Indian, who was observing the law, and asked him why he did not kill deer meat, and he said, "Oh, I like seal meat better." This was an island with a game warden on it; everybody knew these people; there was no attempt to seize the meat.

I do not say that the chief game officials and some of the game wardens are not trying to enforce the law. But, if there are not enough game wardens to cope with the situation, the province or the Dominion Government should contribute money so that the law can be properly enforced. No game warden or chief game warden need tell me that he cannot find the people who are doing these things. If some one 18 miles up the Gatineau is killing deer or moose out of season, give me a man or two, and we certainly can locate him—any one can do that. My suggestion, then, is: Enforce the law against both white man and Indian.

Mr. JACK MINER: I have hunted in Northern Ontario for thirty-four successive autumns. The last three seasons, 1913, 1914 and 1915, in the country where I hunted, the beaver doubled each year. I do not think we could obtain better results than that. Another point: A fur-buyer came into my tent, and offered an Indian $12 each for the beaver he had, provided he could get the tags off, but for those he could not get the tags off he would only give him $7 each.

Mr. E. E. LEMIEUX: The Petawawa Camp Fish and Game Club, for the last nine years, has worked steadily in the interests of the conservation of game. Game has been increasing very rapidly, simply because we did everything possible to prevent people from shooting during the close season. I think, however, that, especially in that district, the wolves have a great deal to do with the diminution of deer. Three or four years ago I was in that district, and I found as many as thirty-six wolf tracks on a 12-mile tramp. We made several attempts to get rid of the wolves. We found the best way was to kill a rabbit, put strychnine into little pieces of the meat about an inch square, and stick these on the alders near lakes and creeks, or at projecting points. By these means we have got as many as twelve wolves. One was a she-wolf with from four to six young; so it will be seen that very good results are accomplished in that way. Many died somewhere else, we do not know how many; but it is safe to say that at least twenty-five wolves were destroyed. We send our game wardens on this work every winter, and results are very satisfactory. We supply them with $10 worth of the purest strychnine, and have put out about 150 baits. Occasionally we get a

fox, but no other animals. There is no doubt that the deer are much depleted by the wolves. I myself on a short trip came upon seven or eight deer that had been killed by them. I have the picture of a deer that had been freshly killed by wolves; you can almost see the freshly-made wounds.

Dr. Bryce: I have been asked by a gentleman from the Dunvegan country, Peace River district, where they propose to set aside large areas for the returned soldiers, to mention to the Commission the difficulty of raising sheep in that part of the country, on account of coyotes, which are becoming very numerous and very dangerous. I do not personally know the facts, but I assume that this gentleman knew what he was talking about, and perhaps we should take some steps towards the destruction of the coyotes in that district. They are doing great damage, and if that is to be a sheep-raising country, and to be settled by returned soldiers, it is very important that this matter should be kept in view by the Commission.

Mr. W. F. Tye (Montreal): We have heard a number of remarks about the destruction of game by the Indians, and one would imagine they were the people principally at fault. But does anyone say that the Indian is the man who has destroyed the game of this continent? Surely we are big enough to put the blame where it belongs—that is, on the white man. In the early days, when I was in the western country, there were just as many Indians and there was plenty of game—buffalo, deer, antelope, small game of all kinds. The Indians were there, and the white men were not. It was then in the days of the Sioux troubles—I am speaking now more of the country to the south of the border—and the only way the United States Government could get rid of the Indian trouble was to kill off the buffalo. Men were hired at $75 a month and furnished with guns, horses, and an unlimited amount of ammunition; the result was that the buffalo departed from that country like the snow before a chinook wind. That was not the Indians, was it? We taught the Indians bad habits right there and then.

Later on, I was connected with the construction of the Canadian Pacific railway—I was out there before the construction of that railway was commenced, for that matter. The country was then filled with little lakes, and I am sure you could go to one of these small lakes and see 1,000,000 ducks, geese, swans, and birds of that kind. And there were more Indians in that country then than there are now, and the game was there. The Indian killed because he required the food. He killed the buffalo because he required the skins to make tepees, but the white man came in, with his insatiable desire for furs, and not only taught his own people to kill off the

game, but taught the Indian as well. The Indian has learned bad habits; now he kills the game not only for food, but, in imitation of the white man, also by way of useless slaughter. If you are going to preserve the game the first thing to do is to make the white man obey the law. The white man makes the laws, the Indian does not; the white man is used to obeying laws, the Indian is not. First make the white man obey the laws, and the Indian will, in the course of time, follow. It is to supply the demands of the white man that the Indian does this killing.

MR. W. C. J. HALL: In the far north, where the Indian has the territory all to himself, have you ever known him to kill the game in such a way as to exterminate it?

MR. TYE: No, I never did. I was not far north; I was in Dakota, Montana, and what is now Saskatchewan and Alberta, far in advance of civilization, and I am sure that——

MR. HALL: How about the Arctic Circle, where the Indian is not molested by the white man? Have you ever heard anything of the Indian exterminating the game there?

MR. TYE: No, and the same applies to the country which is now Saskatchewan and Alberta; before the white man went there there was no extermination whatever. There was a superabundance of game; therefore we are the people who are responsible—let us accept the blame.

DR. HEWITT: If the discussion on this subject is now concluded, I should like to make a suggestion with a view to carrying out the idea I put forward a short time ago, namely, that, together with the complaints that have been made, we should have some really constructive suggestions. I would move, therefore, that a small committee be formed, consisting of Hon. Dr. Smith, of New Brunswick, Hon. Mr. Daniels, of Nova Scotia, Mr. J. E. Bellisle, of Quebec, and Dr. Baker, of British Columbia, to consider this question, and, at a later session of the conference, to bring in any recommendations that it may see fit to make with regard to this question of Indians.

The motion was adopted.

Gun Licenses

Dr. Howard Murray (Dalhousie University, Halifax): Those who are interested in the wild life of our country and its continued preservation—and that should include all good citizens, I should say—must be viewing with concern the gradual disappearance of most forms of our wild life. Legislation, it seems, has done some good in various parts of the Dominion with regard to particular forms of wild life. For instance, we heard this morning that, in New Brunswick, and in my own province of Nova Scotia, the legislation that has been put into effect has produced good results in the preservation of moose. The deer in Nova Scotia is also increasing because of protective legislation. The caribou is remaining in the island of Cape Breton and is holding its own, as Mr. Knight has informed you. But other forms of wild life throughout the Dominion are disappearing, some of them rather rapidly, constituting a great and growing menace to our country.

One of the contributing causes to this disappearance, or extinction, of wild life, particularly in the case of birds, is the fact that, throughout the greater part of the Dominion, no license is required for the carrying of fire-arms, and boys of tender age, as well as men of more mature years, go out with guns seeking game, and, not finding it, decide that, at any rate, they will have a shot at something. You know, a live target is more interesting than a piece of paper; and thus a great many small animals and small birds that are of no use as food, but which are of great value as insect killers, are made away with. I know something about that, because I carried a gun when I was a boy—before I reached the age of discretion—and I can remember what happened on various occasions then. I feel sure that my experience was not unique in that respect, and I believe that, if people were required to take out a license for the carrying of fire-arms, it would help, at any rate, to restrict the indiscriminate killing of small wild life. I desire to move the following resolution with regard to gun licenses:

"That the National Conference of officials, sportsmen, and others interested in the conservation of our game animals and wild life generally, is of the opinion that, as enormous destruction of all forms of wild life, and particularly of insectivorous and other birds, is caused by the wanton killing by guns, especially .22-bore rifles, in the hands of persons wholly indifferent to the conservation of wild life,

and, as such destruction can only be checked by making it illegal to carry fire-arms without a license, the Provincial Governments be strongly urged to adopt legislation that will permit the carrying of fire-arms to be regulated, thereby safeguarding human life, in addition to conserving our wild life."

MR. F. BRADSHAW: I have much pleasure in seconding that resolution. There is a difference between a game license and a gun license. This resolution recommends that a license be required for anyone to carry a gun. If a man goes out shooting gophers he must have a license to carry the gun.

DR. BAKER: Is any provision made in the Northwest Game Act with regard to the carrying of fire-arms?

DR. HEWITT: Yes, the carrying of fire-arms is regulated.

MR. L. A. GAGNON: There is a provision in the New Brunswick game laws forbidding anyone during the close season to go into the woods where game is to be found without a permit.

DR. HEWITT: We are trying to check the people who are not sportsmen—boys, too—around our cities, who go out with .22-calibre rifles and shoot everything in sight. That could be stopped, to a very large extent, if we had a system of gun licenses. The resolution recommends that the Provincial Governments be urged to amend their game laws so as to provide for gun licenses as a means of preventing indiscriminate shooting of wild life. Danger to human life also would be averted by such a system of gun licenses.

MR. J. M. MACOUN: In British Columbia we have gun licenses. I was wondering whether that resolution could not be extended so as to provide that, during certain seasons of the year, even gun licenses need not be carried, unless for a specific reason. For example, in British Columbia, prospectors naturally have to carry rifles with them; but, go where you like in the west, the people round the towns and villages do not go anywhere out in the country without carrying a gun. In addition to providing for a license, there should be a close season for carrying guns, unless for a specific purpose.

HON. O. T. DANIELS: I am rather in sympathy with the resolution, but I want to point out the great difficulty that exists in my province in developing our law along the line of the suggested motion. This is no new thing in Nova Scotia; I take it that it is no new thing in any of the older provinces of Canada. There is no trouble about gun licenses for persons residing outside the country, because the provincial legislature is very glad to make regulations in the best interests of the game and that will conserve it for the people of the province in question. But, in Nova Scotia, public opinion is not yet

sufficiently ripened to ensure the approval of a system of gun licenses applicable to the people of our own province. I am afraid you will find that the same thing applies to some of the other provinces. The advantage of gun licenses is apparent to those who are very desirous of preserving the game, but it is not so apparent to the great majority of the people; an awakened public sentiment is necessary before recommendations of that nature could be enacted into law.

The motion was duly carried.

Fish and Game Protective Associations

Rev. Father Crowley: I feel very strongly on the subject of Fish and Game Protective Associations. I became interested in the question about three years ago, when the sportsmen in Sudbury realized that, unless some steps in the matter were taken by some body, there would be no more game. We felt that the Provincial Government was not taking as much interest as it should in that particular phase of conservation, with the result that game was being unnecessarily slaughtered, both by the Indian and the white man. As was mentioned here by several speakers this morning, a great deal of game—moose and deer—was going into the lumber camps. I know, as a matter of fact, that some of the lumbermen were buying this meat and, of course, were getting it a great deal cheaper than beef.

Another resident of that part of the country who is responsible for a great deal of the slaughter of game is the Finlander. He does not seem to respect the laws at all. Not only has he slaughtered moose and deer, but he is also depleting the lakes of our fish. Every Finlander about the country has one or more nets; so, when we found out what the situation was in that regard, we decided that the best thing to do was to organize an association, composed of the sportsmen in that district. The organization is not confined to the town of Sudbury; it embraces the whole district, and includes a membership of about 150. A fee of one dollar a year is charged.

That is good as far as it goes, but what we should have is a province-wide, if not a Dominion-wide, organization. I do not suppose there are in Ontario more than half a dozen such organizations; there are one or two in Essex and a couple of others in the southern portion of the province. We have tried to get other towns in our part of the country to organize similar societies, but we have not succeeded. The matter is of sufficient importance, I think, to be taken up by the Department of Game and Fisheries, which might send out an organizer to establish such societies in different parts of the province. I feel strongly that the public must be educated.

Our first difficulty was the fact that the people were not behind the game wardens in the enforcement of the law. The game warden in our district now feels that he has behind him a body of men, members of the association, who pledge themselves to observe the

laws and to do everything they can to see that others observe them. If the game warden brings up a man for an infraction of the game law, he feels that he has that body of men behind him, and that is a great help. I assure you that a great deal has been done by our society during the last two or three years. We have only one game warden, where we should have half a dozen. It is impossible for one man to go through a district embracing thousands of miles; if the game is to be protected there must be more game wardens. Last year the game warden was successful in having $5,000 in fines imposed in convictions he secured.

With two other delegates from our society in Sudbury, I have come to this conference, feeling sure that we would hear something which would help us in the objects which we have in view—the protection of the game and fish, not only of Ontario, but of the whole of Canada.

Mr. S. Harris: I represent the Essex County (Ontario) Wild Life Conservation Association, an organization which has been in existence for some time, and which was brought about by a recognition of the fact by the men of that district that, if something were not done, the game would disappear.

This organization is composed of such men as our friend Jack Miner, who did not wait until governments took action, and, from being an ardent hunter of game, came to be the best friend the wild fowl ever had. As you know, he started a sanctuary of his own, and any of you who have visited it will agree that it is a sight to see hundreds of Canada geese showing by their actions that they feel perfectly safe because thay are in Jack Miner's sanctuary. I notice that about ten acres of his farm is being turned into additional ponds and retreats. I have seen the Canada goose come over in flocks and families and drop down into the pond; and, although we were only fifteen or twenty feet away from them, they took no more notice of us than if they were hand-fed fowl brought up in the farmyard.

The report of our third annual meeting, held a few days ago, gives you an idea of the work we have done. Last year the Government of Ontario assisted by making a very large area a sanctuary where not a gun shall be fired. The reason was that pot hunters would get out on point Pelee and take a shot at Jack Miner's geese and ducks; many a duck came back with a broken wing or a broken bill.

I have a great deal more to say on this subject of a constructive nature, but I shall defer my remarks until later. I have not very many complaints to make, but I have some. I was sorry that the

representatives of the Ontario Government had not a little more to say, because there is a whole lot in the game life of Ontario. We have the wolves, of course, and they are increasing. I would advise our forming national organizations throughout Canada to meet once a year in convention, exchange views and compare notes with regard to the conservation of game. I am certain that we would have great results from it.

SENATOR EDWARDS: I think I have attended every meeting of the Commission of Conservation since its inauguration, and I will say that this morning we have had one of the most valuable sessions we ever had, considering the interesting and helpful discussions that have taken place.

MR. JACK MINER: Twelve years ago I called together the sportsmen of my county, and we organized the Essex County Game Protective Association. I said: "Men, we should stop shooting quail." I was almost hooted out of the town hall. At the last meeting over eighty per cent of the people joined in the expression "We will stop shooting quail for ever." That is education.

TUESDAY AFTERNOON SESSION

The conference resumed at 2.30 p.m., Hon. O. T. Daniels presiding.

HON. MR. DANIELS: The first subject this afternoon is "Wild Life Sanctuaries," which was to have been introduced by Mr. J. B. Harkin, Commissioner of Dominion Parks, but we learn with regret that Mr. Harkin is unable to be present. Mr. Harkin, as you are aware, has charge of the Dominion National Parks, several of which have been established solely for the purpose of conserving game, fur-bearing animals, and other wild life. The purpose of the discussion is the value and need of wild life sanctuaries in Canada. Mr. Harkin's paper will be read by his assistant, Mr. Williamson.

Wild Life Sanctuaries

BY

J. B. HARKIN

Commissioner of Dominion Parks

IT is assumed that the subject of wild life sanctuaries was assigned to the Dominion Parks Branch because the Dominion parks in the west, which aggregate about 10,000 square miles in area, are maintained as game sanctuaries. They have been maintained as such for about ten years, and, if an exceedingly great increase in wild life is the test of their success, then there can be no doubt that sanctuaries, properly and fearlessly administered, will inevitably result, not only in the preservation, but in the very great increase of all forms of wild life.

Wild Life Abundant

In the parks to-day the casual visitor does not need to be told that wild life is abundant. He constantly has the best evidence of this fact, because wherever he goes his own eyes show him it is so. Perhaps the greatest results have been obtained in Rocky Mountains park, of which Banff is the centre. Even in Banff, evidence of the results can be seen from day to day. Deer may be seen at the most unexpected moments walking along the streets and paths of the town. It is a common experience among residents to have deer eat food from their hands. In fact, they have become so plentiful that, last year, some of the residents actually circulated a petition to the government protesting against the depredations of the deer in flower gardens and back-yards and demanding a remedy. This petition was dropped, but no better evidence could be submitted of the success of the Rocky Mountains park as a sanctuary.

Effective Warden Service

Ten years ago, in all the districts within easy access of the railway, big game had practically disappeared. Although regulations forbidding the taking, killing or wounding of any wild bird or animal had been in effect since 1890, it was not until about 1909 that an effective warden service was established. At that time, deer were rarely seen near Banff, and sheep and goat were to be met with only in the outlying portions of the park.

Today, a person can sit on the piazzas of the Canadian Pacific hotel at Banff and, with a pair of glasses, pick out mountain goat along the slopes of mount Rundle, the jagged, saw-tooth mountain that lies directly opposite the hotel. Golfers repeatedly stop in their play and watch mountain goat on this peak.

The black bear has become so plentiful that, from time to time, they have to be shot by the wardens, because they have developed a liking for the larders of the citizens. A few days ago a letter was received from the Alpine Club, stating that, unless some special means of protection of their property against black bear were provided, the club could not open its club-house for guests.

Any person walking or riding for a few miles along the main automobile road west of Banff will see at least a few mountain sheep and he may see two hundred. Often, an automobile proceeding up this roadway has to slow up to let the sheep walk off the road. Photographs of mountain sheep, which, as you all know, is ordinarily one of the shyest of animals, can be taken from the seat of an automobile.

The conditions stated above with respect to wild life in the vicinity of Banff prevail throughout the park.

Protection Secures Results

In this connection a few extracts from diaries of the game wardens may be of interest. They have been picked at random and cover all our Alberta parks:

" Sawback district—saw about 150 sheep.

" Government ranch and Panther river—counted 35 deer.

" Ranch to James river—saw about 70 deer in my day's travel.

" Banff from lake Louise—saw about 40 deer, 60 sheep and 14 goat.

" North End park, Hay river—there are quite a lot of moose along the north end of park and caribou are plentiful north of Hay river."

The facts which have been given you demonstrate, I think, that a game sanctuary, efficiently protected, invariably obtains the desired results.

One of the main reasons of the success of sanctuaries is the fact that wild life very quickly learn that they need have no fear of molestation by man. The deer on the streets of Banff, and the mountain sheep in the immediate vicinity of Banff bear this out.

Sanctuaries Appreciated.

The fact that animals very quickly learn that a sanctuary is a sanctuary was forcefully brought to the attention of the Department a few years ago by conditions that developed at Buffalo park near Wainwright. A protest was received from the residents in the vicinity of the park, stating that the park was becoming a sanctuary for coyotes. As you know, at

certain periods of the year, many of the farmers in the west go out coyote hunting, for the specific purpose of reducing the numbers of this predatory animal. The farmers in the vicinity of Buffalo park complained to the department that, as soon as they started coyote hunting, all the coyotes made a 'bee line' for the park, where they evidently knew they were safe. There is no doubt about the facts of the case, and we have had to hunt the coyote within the park with dogs and traps.

The eastern portion of Jasper park and the contiguous country outside the park has a large wild life population. Wardens who patrol that area report that, as soon as the hunting season arrives, all the wild life takes refuge in the park.

These facts are recited to emphasize one of the fundamental justifications for wild life protection by sanctuaries, namely, that wild life very readily recognizes the areas where it is free from molestation and, as such, invariably takes advantage of them.

Co-operation of the Public

There is another matter which experience in connection with the park sanctuaries has brought out, and that is that the public are very readily educated as to the sanctity of the parks from the wild life standpoint. Of course, a preliminary necessity in connection with this education is administration with a firm hand. Despite the huge area of the parks, there is very little poaching. The great majority of people, after a very few years, become thoroughly sympathetic with the efforts of the administration to protect the sanctuary, and have no desire to go out to kill. The small minority who fail to develop such sympathy, on the other hand, develop a wholesome respect for the strong arm of the law.

The Indian has a bad reputation in the eyes of most of the public in regard to the matter of game slaughter, but even the Indian appears to have been educated to at least respect park boundaries. We practically have no trouble whatever with the Indians in the matter of the protection of wild life in the parks.

Indians Respect Sanctuaries

An incident illustrates how completely even the Indians have accepted the idea that there must be no game slaughtered within park boundaries. A provincial game warden had just completed a patrol through a large mountain area not within a park, and found that the Indians had been through some time previously and had carried on the most reckless slaughter. He travelled for several days without seeing fur or feather. The previous year he had patrolled the same area, and knew that, at that time, the district contained quite a fair proportion



YOUNG LIVE BEAVER

Photo, Courtesy Mr. E. E. Lemieux



FLOODS AT POINT PELEE, ONT., IN THE SPRING OF 1919

Photo shows flooded land at the south end of Point Pelee.

Photo, Courtesy Mr. F. H. Conover

of wild life. As he proceeded homeward, with this lesson fresh in his mind, he came to a camp of Indians close to the boundaries of one of the parks. It had been suggested that this park should be reduced in area, and that the portion along which the Indians were camping should be thrown open. The first question these Indians asked the warden was as to the date when this area was to be thrown open, because they desired on that date to begin a big hunt. The warden was so impressed with what he had seen in the devastated area and what he saw would happen in the other area that, though he had, previously, expressed himself favourable to the reduction of the size of this park, he promptly urged, that under no consideration, should this park be reduced in area. It is scarcely necessary to add that the reduction did not take place. This incident, which demonstrates that even the Indians have a wholesome respect for park boundaries, also indicates plainly that white men, who may be inclined to slaughter wild life, can all the more readily be educated to the fact that a game sanctuary must be respected.

Unrelentless Pursuit of Offenders

In connection with the protection of the game sanctuaries, the first essential is a policy of absolutely unrelentless pursuit of all offenders, and this policy has probably been one of the main reasons for the success of our sanctuaries.

Game wardens are born, not made. They must have, above all things, a very strong natural love for wild life. With such officers, the rest is simple. A few years ago, one of our game officers prosecuted his own brother.

When the public, Indian or white, recognizes that an offence will be followed up, regardless of cost or effort, they evidently make up their minds that any hunting they do shall be done elsewhere than in a sanctuary.

Regulation of Fire-arms

With respect to regulations, one of the most important is that it shall be an offence for a person to have an unsealed firearm in his possession. Under the regulations the moment a firearm is brought into a park it must be presented to a warden for sealing, and it must remain sealed so long as it is within the park.

Another important regulation is that any persons who outfit within a park for hunting purposes outside a park, or who go out on trail trips with guides, must be registered. The failure to do so constitutes an offence. With registration, the chief warden knows at all times how many parties are out on the trails and the routes they are following, and, with a system of intersecting trails, it is compara-

tively easy for the wardens to keep in touch with such parties. The telephone system used in connection with fire protection is also a great aid. Under the system which I have described, it is comparatively easy for a small body of wardens to efficiently patrol and protect the large area.

Our wardens look after both fire and game protection, and yet, in Rocky Mountains park, our warden force consists of only eleven; in Jasper park fourteen; in Waterton Lakes park, six. This is a very small force when you consider the large areas to be protected. Rocky Mountains park covers approximately 3,000 square miles, Waterton Lakes park almost 500, and Jasper Park nearly 5,000.

You will notice that the points I have endeavoured to make are, in the first place, that sanctuaries do result in a very great increase in wild life, and that these results are obtained, primarily, through the following causes: That the animals themselves readily recognize and take advantage of sanctuaries; that the public, including Indians, can be very readily educated as to the sanctity of sanctuaries; and that energetic, fearless and unrelenting pursuit of offenders, together with intelligent patrol work, and the insistence on the sealing of firearms, practically eliminate any destruction by man of wild life within sanctuaries.

Suggested Increase of Sanctuaries

Results in the Dominion Parks sanctuaries have been so successful that it seems to me it would be a good policy for a careful survey to be made in each province of the Dominion, before it is too late, with a view to the setting aside of areas for sanctuary purposes, that there may be an absolute assurance that, for all time, there shall be no danger of the disappearance of the characteristic wild life of the Dominion.

Discussion

Mr. W. C. J. Hall: I fully agree with Mr. Williamson's remarks about conservation in this part of the country. I myself have had a little experience in that line. In 1895 I succeeded in getting the Laurentides National park created in the Province of Quebec, embracing an area of 3,500 square miles. At that time the moose had been so depleted that the inspector of the park, a very able and experienced man, had forgotten that the moose carried a bell on its neck—there were no animals of that description left. To get a beaver you practically needed a search-warrant; there were hardly any left. I am happy to say that, before very long, we had both moose and beaver; and, as a matter of fact, we have received com-

plaints from clubs that their lakes are flooded as a result of the work of the beaver. We have so many moose that one of them actually got astray this year and found its way into the city of Quebec and was killed, as it had been worried by dogs and injured.

As to the smaller fur-bearers, many people had been in the habit of hunting in what is now Laurentides park, and they found it very hard to keep out. Before many years, however, they voluntarily called a meeting, when they found that, although they did not get into the park they were buying 300 per cent more fur than they did when the park was open to them. They were extremely well satisfied that the park had been created, although, at the outset, they were dead against it.

Mr. Benjamin Lawton (Provincial Game Guardian, Alberta): I can bear out every statement made by the representative of the Dominion Parks Branch as to the results accomplished in these parks. The province of Alberta is very fortunate in containing the greater part of this park property. In my opinion the establishment of game preserves is the proper system of game protection. Of course, all these areas are really not parks; one of the largest, Buffalo park, is more of a game preserve than a park. The same would apply to the Elk Island park, on the main line of the Canadian Northern railway at Lamont, and which contains sixteen sections, fenced. It was originally established for the purpose of protecting the elk in that district. In fencing the park they enclosed a number of elk, and these animals are rapidly increasing. It was the original home of the buffalo, the greater portion of which were later transferred to Wainwright.

The Rocky Mountains park, prior to 1909, was not a satisfactory game preserve from the standpoint of game preservation. There was practically no game there except on the outskirts, and that is where the hunting parties went to get their game. Hunting parties from the United States would come in, be outfitted at Banff, and taken by their guides out into the park, securing all their game in the game preserve. But, since 1909, a proper and effective system of warden service has been established and the results are as stated in Mr. Harkin's paper.

You may enact laws and you may enforce them, but a guardian service cannot prevent the decimation of game unless it is operated in conjunction with game preserves. Public sentiment is not usually in favour of the expenditure of public money for the preservation of game unless some returns are to be had from that expenditure. Our department in Alberta has worked along

these lines, and the result has been that, following the organization of the Game Protection Branch in 1906, there is in the provincial treasury over and above the cost of game protection, some $40,000.

Possibly we spend more money in Alberta per capita in the protection of game than most of the provinces do. The results are not all that I desire, although we are doing our utmost. From year to year, we try to improve our legislation and make it more restrictive, and I hope that, in the next ten years, we will make even greater progress than we have made in the last.

We have probably a greater variety of big game animals than any other province. We have the mountain sheep, the mountain goat, the elk, the moose, the caribou, the antelope, the white-tailed deer, the mule deer, and I have heard some say we have the black-tailed deer. In 1914 our revenue was probably the largest in the history of the Department. That was just at the beginning of the war. We had more sportsmen buying licenses and the result was that more game was killed than in any previous year. We expect a big increase in the number of sportsmen this coming season, because the great bulk of those who enlisted for overseas service undoubtedly were sportsmen—at least a large proportion of them were—and with the increase of population our troubles this year and in succeeding years will be greater than they were formerly.

Improved legislation properly enforced will undoubtedly have an important bearing in the matter of protection and should eventually bring good results. But the increased number of hunters and sportsmen will mean greater killing of game, and, if we permit the use of unsportsmanlike weapons, which, with the improved mechanical methods of manufacturing, are becoming more destructive every year, the result will be the decimation of the game, notwithstanding any legislation we may enact that is not along the line of establishing game preserves. I have in mind some weapons which I consider unsportsmanlike. Prior to 1905, before the western territories were erected into provinces, the Territorial Assembly enacted legislation prohibiting the use of the automatic shotgun. I would rather see a man use an automatic shotgun than the pump shotgun; I believe the pump shotgun, with six shells in the magazine, is more deadly to the game than the automatic shotgun, and its range is greater. Both guns should be prohibited. Still, I regret to say that the greater number of sportsmen in our province have provided themselves with pump guns, and it would be unfair to ask them to throw them away. The method of British Columbia should, perhaps,

be adopted by all the provinces—that of cutting down the magazine of the pumpgun to, at most, two shells.

We have probably more antelope than any other province or state in the North American continent, but we have only a small fraction of what we formerly had. Years ago these animals were slaughtered much the same as the buffalo were killed. A very limited number were killed during the hunting season; settlement is gradually crowding them out. A few years ago the Parks Department enclosed with a woven-wire fence about 20 of these animals in the southern part of the province on the range where a band of them was running, and I understand that they are now increasing. Between the main line of the Canadian Pacific railway and the Bow river, about half way between Medicine Hat and Calgary, a count made two years ago showed approximately 600 animals there at that time, but settlement is bound eventually to crowd them out.

We have not as many elk as we should like to have. The elk is one of the animals which was persistently hunted in the early days, and, outside of a few scattered bands, we have not very many left besides those which are in the game reserves. There is a nice band in Buffalo park, also one in Elk Island park.

In connection with the game reserve question, it would be advisable to discuss the matter of allowing domestic animals to pasture in game reserves. In my opinion this should not be permitted, especially in the case of sheep. Sheep are very close feeders and destroy the vegetation on which the wild animals subsist, and, while the wild animals might be able to exist during the summer months in an area that has been de-pastured by sheep, they would stand a very poor chance during a hard winter, if there was a heavy snowfall.

At the session of the Alberta Legislature in 1918 two areas which are not covered by the Dominion Park Regulations were declared game preserves, namely, that portion of the Cypress hills to the south of Medicine Hat, containing approximately 51,840 acres, and the Cooking Lake reserve, directly to the south of Elk Island park, which borders the main line of the Grand Trunk Pacific railway, 25 miles east of Edmonton, and contains approximately 61,120 acres. No special provision has been made for the policing or other protection of the game on these reserve; we are depending entirely on our voluntary game wardens, with a periodical inspection by our salaried guardians. Our system in Alberta is to appoint guardians at every point in the province where we can find men sufficiently interested

in the protection of game, and sufficiently public-spirited to undertake this work in a voluntary capacity in their particular districts. These men are also issuers of game licenses, and the only remuneration they get is a small commission on the sale of these licenses.

The establishment of game preserves is, I believe, the ideal system where there are still Indians. The Indian will not continue to hunt where he feels that he is being watched by an officer of the law. Even when he is uncertain as to the standing of anyone in his district he will eventually become uneasy and move on. We have had and we are still having our troubles with Indians in Alberta, but I believe we are in a fair way to effecting a remedy. Some years ago, we prosecuted some Indians, and, on that occasion, the agent of the reserve entered an appeal against the decision of a justice of the peace, and succeeded in having the conviction quashed. That resulted, however, in clearing up the situation with respect to the Indian and provincial legislation. One or two years afterwards, the Indian Department issued the proclamation which is necessary to make the provincial laws effective in the case of the Indians. I may say, for the information of those who find difficulty in this Indian question, that such a proclamation by the Indian Department, bringing Indians of a particular province under the provincial laws, applies only to the laws as they exist at that particular time. Any amendments made afterwards do not come under the proclamation; a further proclamation is necessary to make operative any amendments subsequently passed by a Provincial Legislature. Then it has full force and effect as if it had been prescribed by the Indian Department.

I have also had some success in taking up the matter of game protection with the chiefs of some of the tribes. In the majority of cases the Indian chiefs are anxious that the game should not be destroyed, because they realize that the time is coming when there will be no game, when fur-bearing animals will be exceedingly scarce, and their people will have to depend on their own efforts in an industrial capacity, just the same as the white man. It is not necessary to say that, in addition to the red Indian, we have also many white 'Indians,' and their habits are just the same. But this is a matter which can only be dealt with by persistent enforcement of the laws by salaried game guardians, as we call such men in western Canada, or game wardens, as they call them in the east.

The Indian Department, in dealing with these matters, considers them from the standpoint of the treaties which were entered into between the Dominion government and the Indians. We are not justified in regarding those treaties as scraps of paper; it is up to the

Indian Department and the people of Canada to live up to those agreements, but I believe there are many ways of dealing successfully with the Indian.

We have succeeded in making arrangements whereby the Indian agents issue game licenses for big game to Indians on their reserve. These licenses are issued free of charge. The certificate of the Indian agent is sufficient to show that the licenses have been issued to treaty Indians, and the certificate is accepted by our government in lieu of the usual fee. The Indians, of course, are expected to send in their returns at the end of the year, stating on the back of the license what game they killed, and, although they do not all do this, they are gradually coming to it.

In the northern portion of our province is a large section of unsettled country, inhabited by Indians, half-breeds, and white trappers. The Provincial Government has seen fit to give these people special privileges in the matter of game: they are permitted to kill game at any season of the year when it is required for food. There is no restriction as to age or sex. This also applies in the case of the white settler; but, in the settled districts, there is very little game; it is more in the nature of an open country, and those who are making a success of farming in that district do not find any time to go hunting. I think it is only in the timbered areas that any substantial amount of game is killed. We have no means of finding out definitely what amount of game is killed there, but we realize that it is necessary to kill some game for food.

Since 1902 there has been a close season for beaver in the whole province. North of the 55th parallel, we have been compelled, from time to time, to throw the season open, by order-in-council, to meet the situation resulting from the scarcity of fur-bearing animals. As the killing of beaver is permitted at these times, we have, at present, fewer beaver in northern Alberta than we have on the prairies to the south. Some of you may know the Medicine Hat country. It is a bald prairie; the only trees are brush along the streams. In 1916, the beaver had becone so plentiful in southern Alberta that they were damming the streams and destroying the willow brush and the trees which the farmers and rangers were maintaining for sheltering their stock. We were compelled to issue permits to meet that situation, but these were issued only to the owner of the land or their agents and allowed him to trap only on his own land. In 1917, the conditions were the same, except that the trouble was creeping further north, until, last year, we were granting permits as far north as Battle river. This season we are granting the per-

mits on the payment of one dollar, and the parties who secure the skins are compelled to turn them in to the government, which brands and sells them. Seventy-five per cent of the proceeds is repaid to the owner of the skins. During the coming summer we will be in a better position to evaluate the results of this method. These permits expire on May 1st, and those to whom they are issued are compelled to make returns of what they secure. Under no circumstances will we allow a beaver skin taken south of the 55th parallel to be sold to a private individual. There is a loophole there, of course, in the matter of the skins taken north of the 55th parallel. It is a situation that will eventually have to be met, with a view to preventing the taking of skins south of the 55th parallel on the representation that they were taken further north.

Game Preserves in Eastern Provinces

HON. E. A. SMITH: I believe that the Maritime Provinces are the only part of Canada which has not a sanctuary for wild game. The only difficulty I see, so far as New Brunswick is concerned, is the very small area of our province. We have only about 10,000 square miles, and, according to the paper that was read a few moments ago, the sanctuaries in the west include four or five times our total area. Of course, the question is whether the small preserve which we could have in our province would be of any benefit. I have no doubt that it would. In the centre of our province we have a beautiful chain of lakes, and probably a more suitable situation for a sanctuary could not be found in any province.*

During all the discussion to-day I have not heard any reference to a little animal that has neither fur nor feathers; nobody has mentioned it, or suggested that it be conserved. It is a small animal but we get blood-thirsty about him. We put a bounty upon his head, and we have about exterminated him—at least I should think that we have, judging from the amount of bounty that we have paid out. I refer to the porcupine. The lumbermen sent a very large deputation to the Government and contended that the porcupine should be anihilated. One lumberman said that one porcupine would destroy one thousand feet of lumber in a year—and we know pretty well the value of a thousand feet of lumber to-day. Up to January 31st we had paid bounties on the heads of 2,222 porcupines; this year we are not going to offer any further bounty, because the finances of our province will not stand it.

I have much pleasure in moving the following resolution:

"That the National Conference of officials, sportsmen, naturalists and others interested in the conservation of the wild life of Canada is of the opinion that, in view of the important influence that the existence of a game preserve has upon the conservation of the game of any region, and that, as such preserves have now been established by the Dominion and Provincial governments in all the provinces of Canada that possess big game and fur-bearing animals, with the exception of the Maritime Provinces, the attention of the Governments of New Brunswick and Nova Scotia be drawn to the value of such preserves, and that they be recommended to consider favourably the establishment of game preserves in the central non-agricultural sections of their respective provinces, which regions are admirably suited to such purpose."

*Since the Wild Life Conference a game preserve, including an area of over 250,000 acres, has been established by the Province of New Brunswick, in the Western portion of Northumberland county.

MR. W. F. TYE: I beg to second that motion. I do not think any one can have any doubt about the good results which come from establishment of game preserves. Those who have seen the national parks and game preserves of the west, both in our country and in the United States, realize the extent to which game is developed there and increased. While New Brunswick and Nova Scotia cannot expect to have game preserves as large as those in the West, they can have them in proportion to their size.

DR. HOWARD MURRAY: I was on the point of rising to second that resolution; I am strongly in favour of it. I was much pleased to hear Mr. Williamson say so emphatically that every province should have at least one animal sanctuary. It is a dream which I have sometimes had that a sanctuary should be established in Nova Scotia. As Hon. Dr. Smith said, with regard to New Brunswick, we have a somewhat limited area. I do not think the situation is quite as bad as Dr. Smith pictured it with regard to New Brunswick, but, since Mr. Williamson mentioned the number of miles included in the sanctuaries out west, I have been trying to do some figuring as far as Nova Scotia is concerned. I was wondering where we could put a sanctuary of 3,000 or 5,000 square miles in Nova Scotia. We might get some useful information with regard to the size of a sanctuary from the gentlemen who have had experience in that connection. What is the smallest sanctuary that could be considered likely to bring about beneficial results?

MR. JACK MINER: Ten acres.

DR. MURRAY: I think we could do just as well, any way, in Nova Scotia. I was going to express the hope that the Advisory Board on Wild Life Protection would institute an investigation in Nova Scotia with a view to selecting a possible site for such a sanctuary. After that is done, no doubt some difficulty will be found when the local government is approached. You realize, Mr. Chairman, that those who go before a government with a proposal that calls for the expenditure of money are not received with open arms and told to "Go ahead and do it, we will see it through." It is necessary to make sure that you have public opinion behind you. However, if it can be shown that this will be a good thing for the province—and I do not think there will be much trouble in showing that—I believe that the Government will help the project out. Particularly may this be said, in view of the statement of the representative from Alberta that the sanctuaries in his province were paying their way.

MR. LAWTON: Not the sanctuaries; the game protection in general throughout the whole province.

MR. A. KNIGHT: We have made a small beginning in the way of sanctuaries in Nova Scotia in setting apart winter feeding grounds on the south shore for the wild geese. The Game Commission has more than one district in view in Nova Scotia which might be set apart for a game sanctuary, but we have hesitated to proceed further with the matter because we realized that a game sanctuary was of no use without protection. Before we go further with the matter of game sanctuaries in our province we want to see where the money is to come from to protect the sanctuary after it is set apart.

The motion was duly carried.

DR. HOWARD MURRAY: A resolution has been handed to me by Hon. Mr. Daniels, and Hon. Dr. Smith, Minister of Lands and Mines for New Brunswick, seconds it. It is as follows:

Resolved, that the Dominion Government be respectfully asked to establish in the provinces of Nova Scotia and New Brunswick Dominion Parks which may also serve as Game Sanctuaries and that the Governments of these two provinces be asked to co-operate.

The resolution was adopted.

DR. HOWARD MURRAY: We have the pleasure of having with us this afternoon a gentleman whose name is well known in Canada, Dr. Hornaday, Director of New York Zoological Park. Dr. Hornaday is to address us on the subject of "The Rational Use of Game Animals." He has long been the foremost campaigner in the interest of game preservation in the United States, and he has summed up exceedingly well his views on that subject in his book entitled *Our Vanishing Wild Life*. Dr. Hornaday has also been active before Congress and before many of the state Legislatures in the matter of game laws, with a view to securing better regulations and enactments for the preservation of wild life. Dr. Hornaday is also the author of that delightful book *Camp Fires in the Canadian Rockies*, which, no doubt, has been read by many of the gentlemen present at this conference. I have much pleasure in calling upon Dr. Hornaday.

The Rational Use of Game Animals

BY

DR. W. T. HORNADAY

Director, New York Zoölogical Park

THE words "rational utilization of game" immediately send my thoughts travelling into a region where the rational utilization of game has now become more than ever a burning question. I refer to the regions of the far north, sometimes called the inhospitable regions of the north, where the wild game of the country constitutes each year a very important part of the solid food of the white population. It is not my purpose to enter in detail into a consideration of the needs and the rights of the Eskimo, Indians, and wild tribes of that region; I am thinking mostly of the white population. We know that white settlements are pushing further and further into Alaska and northern Canada. We know that conditions are changing rapidly these days—in Alaska, at least. Conditions have so changed during the past ten years that it is now time to take thought for the morrow and proceed along new lines.

Wild Life in the Hands of Man

In every new country man struggles mightily to harmonize with his environment and survive. Naturally, it is the newest countries that contain the most wild life It is the way of the average frontiersman to make war on the game, and war on every man who seriously attempts to protect it from his onslaughts. In every country, new or old, the utilization of the wild game, and its perpetuation or extinction, are all determinable by the inexorable rules of logic, and of reasoning from cause to effect.

The interests of a great number of people are paramount to the interests of a few. To the conservationist of natural resources, waste is abhorrent, and the extermination of valuable species is a crime. The robbery of posterity is wicked and repulsive; and all robbery deserves to be either prevented or punished.

In every well-settled country containing a fair supply of game birds, game and fur quadrupeds and food fishes, the questions involved in the taking and utilization of those assets of nature create

an irrepressible conflict. Every country produces its annual crop of uncompromising destroyers, and some countries contain a few real conservators.

The western world contains few fanatics of the oriental type, to whom all killing is abhorrent and wicked. The white races of men believe in the doctrine of legitimate sport and sensible utilization; but the game-hog is a constant menace.

The game-hog is a factor with which every government and every individual game protector must reckon. In the slaughter of game he has no conscience, and to him, game laws are an intolerable evil. He is utterly devoid of sentimental or scientific interest in wild life, and he will go far to kill the last representative of a species in order to boast of it.

Killing Everything in Sight

Some game-hogs, who are honestly ignorant of what they are, can be educated out of their evil ways, and reformed; but others can not be. The last annual report of the New York State Conservation Commissioner, George D. Pratt, contains this striking passage regarding the confirmed game-hogs of the Adirondacks who slaughter deer illegally, and for whom no one can plead the excuse of ignorance. Commissioner Pratt says:

"An analysis of the violations thus reveals that they were due not to dissatisfaction with any one law, but to general contempt for the Conservation Law, *per se*. The protectors (disguised as sportsmen) were all required to report whether the hunters in the camps to which they were assigned operated on the general plan of killing practically anything that they saw, and more than two-thirds of the protectors answered this question in the affirmative. The result of this determination is shown in 101 deer that came within the protectors' immediate knowledge, in most cases under their personal observation: 46 were bucks, 44 were does, and 11 were fawns of both sexes. It was a matter of great interest in one camp that one man had killed eight does in the season, while another at the same camp, by a singular coincidence, had killed eight bucks." It is to be remarked that the killing of does in the Adirondacks or anywhere in the state of New York is entirely illegal.

"There were many more illegally killed deer than those mentioned above," says the Commissioner, "regarding which the protectors obtained evidence that resulted in settlements or convictions. Cases arising from the 1917 work were settled for $3,511.50. They involved 79 individuals and more than 125 violations. Already in 1918, 38 cases have been settled, with a total recovery so far of $4,245.

The 1918 cases alone will number between 200 and 300 when all have been closed.

"The Commission wishes particularly to point out that the violations of the deer law involve no particular class or locality more than another. Men of all walks of life are involved, and even some women, who deliberately stood upon runways in wait for deer that were being run by dogs. Efforts to correct the old, outworn point of view regarding wild life—a point of view that would make game the property of whoever can get it, regardless of law—*must accordingly be directed to every class and locality.*"

Laws made to Cover Worst Conditions

Now, in the making of laws, it is always necessay to make the laws adequate to curb the worst elements. No sooner is a new game law enacted than the human vultures who prey upon wild life immediately scrutinize it and study it in order to find its weak spots, and to plan evasions. It is this devilish spirit of criminality that renders it so difficult to provide for the utmost utilization of wild game as food for man. Whenever we see the day wherein all men will gladly obey the spirit of a law, as well as its stern letter, then may we say that the millenium of game protection has arrived.

The continuous development of the interior regions of Alaska and northern Canada, the increase in power transportation, of mining and of general exploitation, has brought a corresponding increase of pressure on the remainders of big game. The valleys of very few navigable streams now contain any considerable remainder of moose, caribou, mountain sheep or bear. To find big game now it is necessary to strike into the interior. The great herds of caribou that only forty years ago came within gunshot of St. Michaels, Alaska, at the mouth of the Yukon, have vanished from the lower Yukon almost as completely as if they never had known that region. Now the residents of St. Michaels must travel hundreds of miles to find the nearest herds of the caribou millions.

Disappearance of Northern Big Game

But the disappearance of northern big game is a large subject, and not to be entered upon here. We are concerned with the rational utilization of the stock that remains. The practical questions now before the people of Canada and Alaska are as follows:

(1) How can we secure the most thorough legitimate utilization of wild game?

(2) How can wastefulness be prevented?

(3) How can the continuity of supply be insured?

The moment we undertake to conserve big game in the northern two-thirds of Alaska, which is north of the 62nd parallel of latitude, we come up against some strenuous demands for the sale of game. Fairbanks now is the storm-centre of a new demand, for the sale of game all the year round instead of in the open season only. Most Alaskans believe that the game of Alaska belongs to the people of that territory, that they should administer it as they think best, and, above all, that the sale of game is not only right, but absolutely necessary.

In 1918, it was noted that the laws of the United States were permitting the sale of moose, mountain sheep and caribou meat during the open season for hunting, everywhere in Alaska north of latitude 62°, and that, during the year 1917, 6,000 pounds of big game meat lawfully had been fed to the labourers employed in the construction of the Alaska Central railway, actually under the supervision of the present Governor of Alaska. That large figure was given by Mr. Thomas Riggs himself, then Alaskan Railway Commissioner, at the hearing on the Sulzer bill, in Congress on March 5, 1918.

The Sulzer bill proposed that mountain sheep, moose and caribou meat should be sold all the year round, everywhere north of latitude 62°, and it was ardently supported by Mr. Riggs and the people of Fairbanks. The Sulzer bill promised to be so destructive to the big game of Alaska that it was easily killed. The episode emphasized with new force the fact that a new game act for Alaska now has become an absolute necessity, and must be worked out in the near future.

Living Conditions in the North

Every conservator of American big game is at least partially aware of the conditions that surround white people who live all the year round in the northern regions of Canada and Alaska. Away from the influence of the lines of power transportation, the procuring of supplies of fresh meat from the flocks and herds of the stock-raiser and farmer is an impossibility. And it is not good that men, women and children should be compelled to subsist for long periods on no other flesh food than dried fish, dried venison, bacon and ham. If we concede that it is right for the trader, the missionary and the soldier of fortune to live in the far north, and rear families there, then we must concede that they are entitled to some supplies of fresh meat from the wild herds that can afford them without the risk of extermination. In the language of commerce, we believe they are entitled to all that the traffic will stand.

The question is, how can we meet the legitimate needs of the widow of fort Churchill, the trader at fort Resolution and the missionary at point Barrow, without the risk of annihilating the breeding stock? Let us assume that no one of these can go out, license in hand, and himself hunt and kill his own lawful quota of game.

In the utilization of the wild game food of those regions, the non-hunters must be fatally penalized because of their physical or other disabilities that prevent them from personally taking their own share of game on the hoof. Now, what is to be done?

The men of the Far North at once will say:

"Provide by law that all those who cannot hunt may buy their share of game from those who can hunt."

This proposal merits careful analysis and consideration.

It is now a widely accepted principle of conservation that no wild species can long withstand commercial exploitation. It is an accepted fact that the surest way quickly to exterminate any wild species is by placing a cash price on the heads of its members.

Opposition to Sale of Game

Throughout the whole of the United States, and I think all of southern Canada, the conservers of wild life are a fixed and unalterable unit in opposition to the sale of game, anywhere, in those regions. That matter has been considered, and at times fought over, for fully ten years; and, if any principles in wild life protection can be regarded as settled for all time, it is the ban on the sale of game and on the sale of the plumage of wild birds. The Sulzer bill could have been, and would have been, buried under a mountain of opposition, both in and outside of Congress, had it been pressed forward.

In view of the well-known and legally recorded beliefs of the wild life conservationists of Canada and of the United States, I now regard it as a waste of time to attempt to devise ways and means for the sale of wild game. The principle that lately has been so gloriously reaffirmed and so everlastingly fixed by the international treaty between Canada and the United States for the protection of migratory game birds against the market hunter and the game-dealer, must not now be discredited in the Far North. The time has come that the sale of game in Alaska must positively stop, before it has brought great harm to the game and to the people of Alaska.

It is a curious circumstance that the men who thus far have saved some of the game of Alaska from annihilation, have done so without either appreciation or thanks from the people of Alaska. But for the initiative of the meddlesome eastern naturalists, in 1902, by this time the accessible regions of Alaska would have been swept



ELK IN BUFFALO PARK, WAINWRIGHT ALTA.

Photo, Courtesy Dominion Parks Branch



ELK IN BUFFALO PARK, WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch

bare of hoofed game. It is utter folly to assume, or to believe, that the people of Alaska alone are either willing or able to protect their big game from extermination, and utilize it on a real continuing basis. In times like the present the truth may better be told bluntly than in any round-about way.

The people of Alaska are, from first to last, diligent exploiters of the natural resources of Alaska, and the majority of the white population look forward to getting out of that territory to spend the remainder of their lives elsewhere. Twenty-five years hence a majority of the Alaskans may be sincere conservers; but a quarter of a century is a long time to wait, and, in the interval, much mischief may be accomplished.

Big Game must be Conserved

No, we can not agree to any sale of game anywhere; because that policy is known to be extra destructive. At all hazards, the big game of Alaska and northern Canada should be conserved on a continuing basis, for the good of the residents of those difficult regions.

The hunters of Alaska may find it impossible to believe that eastern sportsmen have at heart the welfare of the future residents of Alaska who will need wild meat. No doubt very many of them feel that all the protective efforts of United States men are designed to protect United States hunting grounds; but all misunderstandings of our motives in Alaskan conservation we must accept as an unavoidable part of the burden, and as coming all in the day's work.

I believe that, on this point, we are indeed thinking more of the welfare of the Alaskans of the future than is thought by the Alaskans of today.

And now what can we offer as an attempt at a solution of the puzzling question raised by the widow at fort Churchill? It is time to put forth something intended to be constructive. We are absolutely certain that a way can be found to protect the rights of the widow, the missionary and the trader without the surrender of a great foundation principle, and without going halfway to meet disaster by providing for the sale of game.

In an effort to be both brief and clear, we submit the following proposals as candidates for adoption into a code of principles:

Proposed Principles

1. In the well-settled regions of the United States and Canada, the supply of wild game is nowhere sufficient to render it an important food supply; and in view of its steady destruction by man, predatory mammals and birds, severe winters and scarcity of food and cover,

game killing in those regions must be regarded as a severely limited pastime, and not as an industry in competition with the stock-raiser and the butcher.

2. In well-settled regions, it is impossible to make bag limits too small, or open seasons too short, for the best continuance of the game supply.

3. No frontiersman can reasonably be expected either to devise, or to execute, unaided by his Federal Government, methods for the adequate preservation and increase of large game.

4. Well-settled and well-fed regions require game laws of greater stringency than frontier regions.

5. Frontier and savage regions require to be especially defined on the map, and provided with game laws specially adapted to the needs of their inhabitants and to the available supply of game.

6. The strict regulation of game-killing in frontier regions inures directly to the benefit of the people most dependent upon the game for their existence.

7. The sale of game should not be permitted at any time, anywhere; because all commercialization of wild game and other forms of wild life is thoroughly exterminatory in its effects.

8. In all countries, the rational utilization of game is desirable, but only on a basis that will provide amply and adequately for the perpetuation of the breeding stock.

9. Regions that are remote from lines of power transportation, or are, in winter, entirely cut off from supplies of fresh meat from without, are entitled to preferential treatment.

10. The relief of persons inhabiting frontier regions who by reason of sex, age or other causes are unable themselves to take out licenses and hunt and kill their animal quota of game must be specially provided for by law.

11. Every community large enough to contain a post office should be established as a game-protection centre, or unit, and a deputy game warden should be appointed for each centre, to whom an annual salary should be paid during satisfactory service, no matter how small the salary might be.

12. The duty of every such deputy game warden should be to issue hunting licenses, check up the reports of license holders, and generally promote and be responsible for the observance of the laws affecting game.

13. The cold-storage of legally-killed game to promote its full utilization by the holders of hunting licenses, beyond the regular season for hunting, is desirable and necessary.

14. It is time for the Governments of Canada and the United States to stop all killing of female hoofed game, other than caribou, by Indians, by prospectors, and by all other persons.

15. The waste of game should, under certain fixed conditions, be made a penal offense.

16. Regulations should be framed to require the reasonable salvage of game meat by sportsmen.

Laws to Cover Special Conditions

It would be placing a very low estimate on the mental fertility of Canadian and American law-makers to assume that it is impossible for them to provide a share of caribou meat and snow geese for the widow and the missionary without the sale of game. To the lay mind it seems entirely possible to work out a scheme for having a certain amount of hunting by proxy, under special licenses, prepared and issued to meet such cases. The game warden or his deputy, or, in their absence, some other government officer, could determine the merits of each application and exercise the discretion of issuing or not issuing a license to hunt by proxy. The holder of such a license could be relied upon to find a suitable person to act as a proxy, go out and make the kill and haul in the meat, for a daily wage consideration. Such proxies should not be issued to persons able to hunt for themselves; and the transfer of game by barter should be treated the same as the sale of game.

The feeding of the refuse portions of game to sled dogs should be provided for by law and regulation rather than be permitted to continue unchecked in the total absence of regulations.

Family Unit the Basis for Licenses

In the issuance of licenses, the family unit should constitute the basis of issue. Any law which, like those of certain western states of America, provided for the issue of a full hunting license to each member of a family would be a mistake, and occasionally would lead to heavy slaughter.

A hasty survey suggests that, with a liberal bag limit, one hunting license to four persons of one family would not be very wide of the mark. The bag limit of our Alaskan Game Act permits the killing of two moose, five caribou and three mountain sheep, which is certainly enough fresh meat for four persons for four months, if it be *properly utilized.*

The Nova Scotia law, that forbids sportsmen to leave large quantities of good meat to spoil in the wilderness, or to be devoted to the maintenance and increase of predatory game-destroying wolves, is an excellent law. Ethically, no sportsman has any special right to waste good edible meat in hungry lands. Let the salvage of meat be a part of the price that the sportsman pays for the privilege of pastime slaughter of valuable food animals.

New Alaska Game Act Suggested

In response to the demand of the people of Fairbanks, Alaska, and others nearer home, that the sale of game privilege be greatly extended throughout northern Alaska, we reply that the time has come for a new Alaskan Game Act which will completely stop the sale of game, and provide for a safe and sane system for the better utilization of the wild game

of that territory. We have suggested to the Fish and Game Club of Juneau, southeastern Alaska, that an unofficial commission be assembled, to consist of five persons, three of whom shall be residents of Alaska, to consider all the facts and proposals available, and evolve a new Alaskan Game bill. While that proposal has met with some favour, its future is, of course, uncertain. At all events, however, it appears to the writer to offer the best approach to a new system of combined protection and utilization.

Alaskans are greatly disturbed by the destruction of valuable game by wolves, and they appeal insistently for governmental relief. That subject is of pressing importance, but is quite apart from these observations.

In conclusion, there is now every reason for advocating, in the rational utilization of game, prompt and thorough consideration, and firm and energetic action.

Sale of Game

MR. F. BRADSHAW: We have all listened with a great deal of interest to Dr. Hornaday. This is the first opportunity I have had of hearing him, although I know him very well by reputation.

I think that the dominant note in the address which we have just heard is that the commercialization of game is one of the most difficult features of the movement in which we are all interested. That should be eliminated throughout this Dominion if we can possibly eliminate it. Up to 1917, our Saskatchewan Act prohibited the sale of game, but a proviso made it possible for any keeper of a restaurant or boarding house to serve game on his table, provided it had been secured in conformity with the provisions of the act. Last year we amended that section, and now it is against the law to sell game under any circumstances. Little or no opposition has been made to this amendment; it is one of the most popular sections in our act.

I have much pleasure in moving the following resolution:

"That this National Conference of officials, sportsmen, naturalists, and others interested in the conservation of the game animals of Canada, is of the opinion that the sale of protected game for food purposes is not only unnecessary, except in certain of the more remote districts of the Dominion, but it is positively inimical to the conservation of our game resources, inasmuch as it leads to the destruction of wild game mammals and birds by market hunters rather than by sportsmen and farmers desiring the game for their own consumption, and that the game so killed for purposes of sale is consumed largely by people who do not need it and who, as a rule, have no interest in the conservation of the game they are helping to destroy. And that, in view of the fact that more than two-thirds of the chief big game states of the United States and several of the provinces of Canada have already prohibited the sale of protected game, this Conference would respectfully urge the governments of those provinces in which the sale of certain game animals is still permitted to prohibit the sale of all protected wild game and to make such provision as may be necessary to permit the sale of game animals propagated in private or government game preserves."

DR. A. R. BAKER: It affords me much pleasure to second this resolution. In British Columbia we have practically done away with the sale of all kinds of game, except in some of the remote districts of the north, the residents of which find it impossible to get fresh domestic meat during two or three months of the winter. We allow the sale of moose and caribou bulls over one year of age only in the

electoral districts of Atlin, Prince George, Omineca and Cariboo from October 1 to December 15. These are the districts in which it is practically impossible to get any communication with the outside world during the period mentioned, and, for that reason, we must allow the residents there to kill moose and caribou during a short season for food purposes.

I am very much in accord with the sentiments in the paper which has just been read to us, and with the sentiments expressed in this resolution relative to the sale of game.

DR. HEWITT: I wish to read some extracts from a letter which we received from Mr. W. H. Allen, president of the New Brunswick Guides Association, as it rather bears on this subject:

NEW BRUNSWICK GUIDES ASSOCIATION,

PENNIAC, February 10, 1919.

MR. JAMES WHITE, Assistant to Chairman, Ottawa, Canada.

MY DEAR SIR,—Your letter relating to the meeting of those who are interested in the preservation of wild animal life came to hand in due time.

I thank you for advising me of the same, and would be very glad and willing to attend this meeting, had I not made previous arrangements to go to New York, Cleveland, Syracuse, Buffalo, Paterson and other places with some motion pictures that I have.

The preservation of big game interests me, as I have been a sportsmen's guide for over 30 years, and know what the game means as an asset to our country.

As you perhaps know, one moose killed by a non-resident will bring to the country where the moose is killed over $300, while, if killed by a resident, it will only bring the price of the antlers and skin.

I am glad to tell you that New Brunswick, last year, passed a law prohibiting the sale of game, and the effect of this law is easy to see, as there were no pot-hunters roaming through our forests, killing these beautiful animals for sale.

As you might know, there has been great 'kicking' about this law by the pot-hunters and their friends, and I greatly fear that the pressure will be so great at the coming session of the House that this law will be changed and the sale of meat again made legal. I hope that

at your Conference you will dwell at some length on the matter of prohibition of the sale of all kinds of game.

Your organization has much weight, and let us assure you that the influence of such an organization will be felt throughout every province in Canada.

I would suggest that as soon as your meeting is over, your Secretary write a strong letter to each of the provinces, having big game, urging the prohibition of the sale of all kinds of game.

The matter of game sanctuaries is one that should interest every lover of the out-of-doors.

In closing, let me urge that you put determination into your efforts along the lines mentioned in your letter.

If the assistance of the guides, being members of the New Brunswick Guides Assn., should be of service to your association, let me assure you that I will use my influence to give this assistance.

Wishing you every success, I am,

Sincerely yours,

(Signed) W. H. ALLEN
President, New Brunswick Guides Assn.

That is the opinion of the president of the New Brunswick Guides Association, which, I believe, is the only Association in New Brunswick interested in the protection of wild life. It illustrates very well the attitude which the guides take towards this problem.

Dr. C. A. Wilson: In the far north, particularly in the Mackenzie basin, the consumers of game do not buy it; in fact, ammunition is so expensive in that part of the country that very little game is killed by the natives. As long as they can get rabbits, and things of that kind they live very largely on them.

The motion was duly carried.

Game in Cold Storage

MR. BENJAMIN LAWTON: I have a resolution relating to the storage of game. The sentiments that have been expressed certainly meet with my approval, in view of the experience we have had in connection with the storing of game. There is a great quantity of game at present in the cold storage plants of the Dominion. Some of this is moose, and there are ducks—I will not say that the larger quantity of those killed two years ago are still in storage, but, of the game killed one year ago, there is still in storage quite a large quantity of moose meat and ducks. The resolution is as follows:

"That the National Conference of officials, sportsmen, and others interested in the conservation of our game animals, is of the opinion that, as one of the chief incentives to securing as large bags of game as the law permits, and thereby encouraging excessive slaughter, is the fact that cold storage plants afford facilities for the storage of such game, the different governments be recommended to require the owners of such plants to furnish to the respective game officers periodic reports on the quantities of game in store, and the ownership of the same."

MR. HARRIS: After game is kept in cold storage a certain length of time it becomes poisoned and unfit for consumption. It should not be held in cold storage longer than six months, and, if the mover will add that to his motion, I shall be glad to second it. When these meats are held in storage a long time, the cold storage plants, instead of being useful to the people, assist in increasing the cost of living.

MR. LAWTON: I am agreeable to having that added. The following words could be inserted at the end of the resolution:

" and to require that such game shall not be kept in cold storage longer than six months."

MR. HARRIS: I have much pleasure in seconding the resolution as amended, and I trust that this meeting will express itself in no uncertain way on that point.

MR. E. E. LEMIEUX: In Ontario we are not allowed to keep game in cold storage after the 31st December. That gives ample time for taking it out. The period during which the game is in storage is, therefore, a reasonable one, and there is no use in keeping it there after that date.

Resolution as amended, agreed to.



ANTELOPE IN BUFFALO PARK WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch



ANTELOPE IN BUFFALO PARK, WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch

HON. MR. DANIELS: We have with us Mr. E. W. Nelson, Chief of the Biological Survey, United States Department of Agriculture. Mr. Nelson represents the United States Government at this conference, and for this reason, as well as for personal reasons, we are most gratified to have him with us, particularly as one of the objects of the conference is to promote not only inter-provincial co-operation but international co-operation as well. The successful conclusion of the efforts to secure the international protection of migratory birds indicates what can be done in the way of international co-operation, and we hope that this will be followed by further efforts in the future.

We should be glad to have Mr. Nelson address us on the work that the United States Government is doing and the possibilities of international effort in wild life conservation.

The Migratory Bird Treaty

BY

E. W. NELSON

Chief, Bureau of Biological Survey, United States Department of Agriculture

I assume that it is not necessary to tell this audience anything about the history of the Migratory Bird Treaty for the protection of migratory birds in Canada and the United States. The regulations under the treaty were put in force in the United States the 1st of August, 1918. At first, although most of the State game commissioners in the country had been heartily in favor of the Migratory Bird Treaty, following the issuance of the Federal regulations there was a feeling among some of the game commissioners that the Federal authorities might be inclined to unnecessarily interfere with State game affairs and thus weaken their authority and standing in the States. Through correspondence and personal conferences with the State officials, however, only a short time elapsed until a change of sentiment was evident. The State game commissioners became convinced that it was the purpose of the Biological Survey not to work to their detriment, but to assist them so far as possible in building up the game supply of the States, and, through them, the game resources of the country. I am pleased to be able to say that the Biological Survey is now on the friendliest terms of co-operation with the game commissions of practically every State.

General Law Covering the Country

The advantage of the Federal law in bringing uniformity of seasons over great areas in which approximately uniform conditions prevail, is becoming more and more apparent not only to the State game officials, but to the sportsmen at large. The States are rapidly modifying their game laws to make their seasons covering migratory birds conform with the Federal regulations. Already more than half the States have brought their laws to so conform, and many of the others are taking steps to the same end.

One of the advantages in having State laws conform with the Federal regulations was evidenced in one of the States I visited last

autumn. At one time, the game commissioners of this State were inclined to hold the opinion that, with its small appropriations for the administration of the Migratory Bird law, the Biological Survey would ask for an unreasonably large amount of co-operation from the States in administering the Federal law. The State game law there had already been made to conform with the Federal regulations under the former Migratory Bird law. Soon after it became evident that the Migratory Bird Treaty Act carried with it real powers of enforcement; it also became obvious that a violation of the State law at the same time was a violation of the Federal law and the violator became liable to prosecution in the Federal as well as in the State courts. This served greatly to strengthen the hands of the State game commission in enforcing the State law, since violators who had been more or less defiant in regard to the enforcement of the State law, when confronted with the alternative of having their cases taken to the Federal courts for prosecution, desired at once to plead guilty in the State courts. It is apparent that this double liability, to which a game law violator becomes subject, will serve as a strong deterrent against illegal shooting. In the State mentioned the game commission not only lost its feeling that it might be imposed upon by the Federal authorities in requests for co-operation, but urged the Biological Survey to appoint a considerable number of the state wardens, deputy federal game wardens, in order that the State as well as the Federal law might be more effectively enforced.

Public Sentiment Favourable

There is little doubt but that experience will so thoroughly demonstrate the usefulness of the Federal law in assisting the States in maintaining and building up their game resources and in enforcing the State laws, that the friendly feeling for the Federal law will continually increase. We have been gratified also to receive offers of co-operation from State game officials and expressions of hearty approval from sportsmen, after our first efforts to enforce laws in several of the States in which, heretofore, through the backward state of public sentiment, game laws have been honoured more in the breach than in the observance. One of the greatest effects of the migratory bird law will be in building up a healthy public sentiment for game conservation in many parts of the country where this is much needed, and in this way also it will be of the utmost service to the State game authorities.

The Federal Government—I speak only for the United States of course, but think the situation is very similar in Canada—desires to interfere as little as possible with the administration of the State game laws, except as the requirements of the Federal law render it

necessary. As Chief of the Bureau of Biological Survey, in charge of the administration of this law, it is my earnest desire that we may be as helpful as possible in building up the game resources of the country. This will be to the advantage of all the States. Personally, we gain no benefit from this in Washington other than the satisfaction of doing a good piece of work. We are thoroughly interested in the conservation of game, and have a keen desire to be useful in perpetuating the migratory game supply which, as is well known, previous to the enactment of Federal legislation was rapidly decreasing.

Game a Valuable Natural Resource

Game is one of the valuable natural resources of all of the States, and there is no question that the Federal law is resulting in the increase of migratory game and of certain useful migratory insectivorous birds. Ever since the original migratory bird law was passed in the United States in 1913, spring shooting has greatly decreased, and every reliance can be placed on the hundreds of reports from all parts of the country that there has been a steady increase of migratory wild fowl. In many of the States, especially in the north, ducks and geese are reported as breeding in places where they have not bred for years, or that there has been a great increase in the number of breeding birds, simply because they were not molested by hunters in spring. Before the Federal law was passed it was difficult for a duck or goose to linger anywhere in the United States without being killed or hunted away from its resting places, and often it was given no peace until driven beyond the Canadian border and far into the north, where people were so scarce that no one was there to molest it. Now many birds may stop to breed in marshy water-holes and ponds in many districts, especially in Minnesota, the Dakotas and other Western States. A letter from the President of the State University of Nevada stated he had lived for many years in that State, and, after the Migratory Bird law was passed, had for the first time, seen wild geese stop and nest in marshy lakes there.

The present season has been an extraordinary one owing to the unusually mild winter. The birds of the autumn migration failed to appear as usual in many of the Middle Western States and ducks were not seen in various localities where, in normal seasons, they have been abundant. As against this, we had reports from different sections of Chesapeake bay that canvasbacks had appeared in enormous numbers, exceeding anything remembered by most of the local hunters. From other places came reports of enormous flights of geese and other waterfowl.

Prohibition of Sale

One of the most effective regulations for conserving game birds under the Migratory Bird Treaty law has been the prohibition of the sale of migratory game birds throughout the United States. In addition we have made a daily bag limit of twenty-five ducks. Under the Federal law, while no State can make a bag limit exceeding that number, the States retain the right of still further protecting them by decreasing the limit if they so desire, and smaller bag limits are now in force in numerous States. Under the Federal law, the States are not permitted to exceed the limit set for the protection of migratory birds, but are given the general authority still further to protect them by decreasing the season or the number of birds to be killed within the Federal limits, or entirely to prohibit their being killed.

Some objection has been raised to the Federal limit of twenty-five ducks a day as being too large, but, in view of the right of the States to reduce this number, it appeared advisable not, at first, to make the Federal limit too restricted. Some sportsmen, especially those who maintain large shooting preserves at great expense, held that the bag limit of twenty-five was too small a number. I am pleased to say, however, that these and other sportsmen are continually becoming better conservationists. For instance, several friends of the Biological Survey, who are shooting-club members and who had first thought that we were doing an unfriendly thing by establishing the Federal bag limit of twenty-five ducks a day, have since admitted that it was the right thing to do. They are expressing a willingness to forego their former privileges on the admitted grounds that it is necessary if our supply of wild fowl is to be maintained.

The continued transformation on a large scale of marshy lands into farms in the Western United States and in Canada is decreasing the resting places and feeding grounds of migratory wild fowl, and constitutes one of the most serious dangers to the future of these birds. This is not only operating greatly to the detriment of bird life at the present time, but is proceeding at a rate which raises a serious problem for the not distant future.

Some Species Almost Lost

The splendid whooping crane, that was formerly so abundant in Western Canada and the United States, is now almost extinct, as is also the trumpeter swan. Their homes have been taken from them by people occupying areas where they formerly bred. Unfortunately their breeding grounds were situated within what has become a great farming region, which is being more and more densely populated and increasingly cultivated, so there appears little hope of saving them. The more insignificant

birds, and those which go to the north to breed, have a better chance for the future. Those nesting in the far north will no doubt have abundant breeding grounds into the distant future, the greatest danger to such birds being a lack of food and resting places in their southern wintering grounds.

Formerly many hundreds of thousands of our geese and ducks wintered in Mexico. Enormous numbers resorted to the lakes in the valley of Mexico, where there were large areas of ideal feeding grounds. Unfortunately, the lakes in the valley of Mexico have shrunken to only a small percentage of the size they once had, and the birds that are left are being shot in great numbers for market purposes. The marshy ground about lake Chapala, also on the southern border of the Mexican table-land, formerly constituted a splendid resort for wild fowl, where myriads of ducks, geese, cranes, and other birds passed the winter. The decrease of available marshes, with increased hunting, have sadly reduced the birds there, as well as in many other parts of this region, where they formerly abounded during the winter months. These reductions in the wintering homes of our migratory wild fowl emphasize the urgent necessity for providing, not only breeding reserves, but wintering sanctuaries and feeding grounds for them. Such sanctuaries are especially needed in the United States. We already have two great refuges on the Gulf coast in Louisiana, but others are needed in Texas and in various parts of the Mississippi valley, as well as on both coasts. I rejoice to learn that such refuges are being provided in Southern Canada, places where birds may stop to rest during their migrations and be assured of food and safety from molestation. If a sufficient number of such sanctuaries are not supplied and if the drainage and devotion to agriculture and other purposes of the marshy areas continue, migratory waterfowl will diminish despite every effort along other lines to conserve them. It is obvious that these birds cannot exist unless they have sufficient areas in which to resort and feed, and particularly, sanctuaries where they may be safe from the persistent harassment that is bound to increase in unprotected areas with the growth of population.

Wild Life Sanctuaries Essential

One of the most helpful ways in which the people of Canada and the United States can co-operate is through working out a plan whereby sufficient refuges for wild fowl can be provided and maintained on both sides of the border. Preliminary to a thoroughgoing plan for such refuges, a survey is needed to determine the available areas and other relative fitness for the purpose. Such a survey the Biological Survey is now conducting in the United States, taking the work up state by state as we have

the means for the purpose. Much useful information has already been obtained.

The violators of the Migratory Bird law have not all ceased their activities. Convictions have already been secured and fines imposed in seventeen cases; about two hundred other cases of violations of the law are ready for presentation to the courts and will be prosecuted as rapidly as possible.

We are making a special effort to stop the killing of the beautiful white herons and the traffic in the aigrettes obtained from them. Owing to the demand for the plumage of these birds for hat ornaments they have been nearly destroyed in many of the states where they were once abundant and among the most interesting and picturesque members of the native bird life. Under the Migratory Bird law these birds are protected, and we are seizing plumes in millinery stores and otherwise working to discourage the destruction of the birds. We are not proceeding against ladies wearing aigrette plumes, although it is unlawful for such plumes to be held in possession. It is considered that, in stopping the killing of the birds and preventing dealers from handling the plumes, this matter may be controlled more successfully, and without the friction which would ensue from taking up the matter with the individual wearers of the plumes, who frequently possess them in entire ignorance of any law against it. We are, however, conducting a publicity campaign to inform the public, and I am pleased to say that some of the organizations of dealers in millinery goods are preparing to inform their members and the public of the illegal character of dealings in aigrette plumes. The losses to the dealers of plumes are severe enough, so that it will take but a few examples to render traffic in aigrette feathers highly unpopular. One milliner in Little Rock, Arkansas, had $1,500 worth of aigrette plumes seized from his stock a short time since and was fined for possessing them. In another case, a dealer in New York had a great number of bird skins for hat purposes. On learning this, one of our men examined them and returned a few days later for the purpose of seizing them, but the dealer stated that he had consulted his lawyer, and, as a result, had destroyed the skins. As the vast majority of dealers in millinery goods are reputable merchants, there is no question but, as soon as the fact becomes known that traffic in these bird skins and plumes is unlawful, this traffic will soon come to an end.

Migratory Bird Treaty Act Constitutional

It is probable that you are all aware of the fact that the constitutionality of the original bird law in the United States, which was passed in 1913, was questioned through a case originating in the United States Court in

Arkansas. While this case was still before the Supreme Court of the United States, the Migratory Bird Treaty was negotiated and the Migratory Bird Treaty Act and regulations put in force. This act repealed the old law, and, as a result, the Attorney General of the United States requested that the old case be dismissed, since, in view of the repealing of the law, any continuance of the case would be purely for academic purposes. The day following the dismissal of this case the newspapers came out with the statement that the Migratory Bird law had been declared unconstitutional by the Supreme Court. This statement has caused much trouble and a host of inquiries, even including many from Canada. We have been kept busy ever since explaining that the Supreme Court had made no decision in the case, and that the dismissal had nothing whatever to do with the constitutionality either of the old or the new law. However, the confusion resulting from the misleading publicity in the press revived the spring shooter in various parts of the country, and we have had many letters from various sections stating that plans were being made for spring shooting. As a result a considerable number of men have been arrested for violating the law, who have claimed that the law is unconstitutional. Such men will have an opportunity of taking up this contention with the courts.

A Drastic Lesson

About a week after the mis-statement concerning the action of the Supreme Court had appeared in the newspapers, 81 canvasback ducks were found on sale in the market in Washington. They were seized and donated to the patients in the military hospital, so that there was no profit in that transaction for the dealer. A Washington restaurant was found at this time serving canvasback ducks to its patrons. These also were seized and a case made against the restaurant and against the man who sold the ducks to it. All such cases are educational. It does not take dealers long to learn that the authorities are in earnest in enforcing the law, and the great majority of them are ready to abide by it. It is probable that it will be a long time before it will be possible to find another dealer selling ducks in the Washington market. The seventeen cases in which violators of the Migratory Bird Treaty Act have been fined cover violators from California to Maine, including many of the intermediate States, so that the public has had an opportunity of being advised as to the enforcement of the law.

There is no doubt but that a case will eventually be brought before the Supreme Court of the United States to test the constitutionality of the Migratory Bird Treaty Act, but we have every



WILD GEESE ON PREMISES OF MR. JACK MINER, ESSEX CO., ONT.



WILD GEESE ON PREMISES OF MR. JACK MINER, ESSEX CO., ONT.

The above ponds are the stopping off places for the Canada geese, in their migratory flights in the spring and autumn. From a nucleus of five, the number has grown to thousands.

Photos, Courtesy Mr. Jack Miner

confidence in its being declared absolutely constitutional. There was a great division of opinion concerning the constitutionality of the original Migratory Bird Act, but a considerable number of lawyers who doubted the constitutionality of that Act, after careful investigations, have expressed their full confidence in the constitutionality of the present law. We implicitly believe that we have a law which will stay on the statute books, and one which will build up our resources in migratory birds and serve as an insurance against the disappearance of many of these birds from the North American continent.

WEDNESDAY MORNING SESSION

Dr. Howard Murray: In the absence of Senator Edwards, the acting Chairman, I have been requested to take the chair at this meeting and introduce the speaker, who is to address you on the "Attracting of Wild Fowl." It is a case, however, where the chairman stands in greater need of being introduced to the audience than the lecturer himself does. The fame of Mr. Miner—Jack Miner—of Kingsville, Ont., and his great success in attracting the Canadian goose, which is about as wild a bird as can be found anywhere, and in his overcoming the fears and the prejudices of that wily bird, have extended far and wide. In fact, it has been said that his fame has extended as widely as the territory covered by the migratory birds in their wanderings—the birds which he has done so much to assist and to protect.

Attracting Wild Fowl

BY

JACK MINER, of Kingsville, Ont.

I assure you it is a privilege for me to meet with so many bird lovers. We love out-of-door creatures, or we would not be here this morning.

Now, you will have to pardon my lack of education. I am one of those men who are born bare-footed and educated out-of-doors. However, I was father's favourite. Perhaps it is not just the proper thing for fathers to show partiality, but mine did. He always called me in the morning to build the fires; possibly in that way I got out a little earlier than the rest to hear the birds singing.

Outside of unavoidable sadness, my life has been one continuous round of enjoyment; the failures and disappointments and the dark storm clouds have been wiped out of existence by success, by out-of-door life—a light which has brightened my path right up to the present and given a faint glimpse of the beyond. I have heard people say they have read that there was never a tribe of heathen discovered on earth who did not worship some kind of god. No intelligent man can live out of doors without being compelled to believe that there is an over-ruling power.

God created the fowls of the air, and so on, before he created man, according to Genesis, 1st chapter and 21st verse. Then in the 26th verse, we find these words: "And God said: Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth." Does that mean that we are to have dominion over those big flocks of wild geese, so far away that you have to look twice to see them? You know how high they sometimes are; you can just hear them. That is what it says. Then we read further in Deuteronomy, chapter 22, 6th and 7th verses: "If a bird's nest chance to be before thee in the way in any tree, or on the ground, whether they be young ones, or eggs, and the dam sitting upon the young, or upon the eggs, thou shalt not take the dam with the young; but thou shalt in any wise let the dam go, and take the young to thee;

that it may be well with thee and that thou mayest prolong thy days." But, if a duck lit in one of the rivers here, all the educated people in this room would rush down—there would be ten guns out there to shoot it.

Reading in the book of Job, we find these words:

"No doubt but ye *are* the people, and wisdom shall die with you. But I have understanding as well as you; I *am* not inferior to you: yea, who knoweth not such things as these?.....But ask now the beasts, and they shall teach thee; and the fowls of the air, and they shall tell thee."

Barn Swallows Appreciate Protection

When the first barn swallows came to our tile shed, on our little farm at Kingsville, Ont., they nested 300 feet away—as far away as they could get from where we were working. We protected the swallows from their deadly enemy, the sparrow that man brought to Canada—the English sparrow; not the one that God put here, don't forget that. They destroyed the first brood, but we protected the swallows and consequently the sparrows did not destroy any more. Remember, the shed had stood there for ten years, equally as inviting. The second year there were two nests; the fifth year there were twenty nests in the tile shed, and, instead of being as far from us as they could possibly get, fifteen out of the twenty nests were within twenty feet of where we were working. They had come to us for protection. You have to believe that. They destroy large numbers of house flies. The ladies say—of course, the ladies never tell what is not true—that there is not more than one house fly now where there were five previous to the coming of these barn swallows, purple martins, and so on. Scientists tell us that the fly will carry that deadly disease, typhoid, and, if we preserve the swallow which destroys these flies, surely it shall be well with us and we shall prolong our days. We protected one nest; now, one hundred swallows are raised in that shed every year.

Robins are Enemies of Cut-Worms.

Now, what good is the robin? Everybody knows the robin. A boy came along the road with a .22 rifle, saw a robin sitting on the fence and killed it. I went over and picked the robin up. Two cutworms were squirming on the ground; the robin had had them in his beak. I held the bird up, and two more fell out of his mouth. Remember, one cutworm will cut down five tomato plants in a night. This fellow does his work and then hides under the soil; Mr. Robin comes hopping along, picks in there and pulls him out—and turns him into a robin. If anyone tells you that a robin will destroy one hundred cutworms

in a day, take it from me that it is true. The following morning, this boy promised me that he would not shoot another robin. In the fir tree by our house were two little robins dead under the nest and two in the nest just alive. We took these two little robins in, warmed them up, and made some custard for them—one egg, half a cup of milk, no sugar. They couldn't open their mouths, they were so nearly gone. We took one of them, pried his beak open and dropped in some custard, and the first thing we knew he 'came to,' and in a minute or so began to squeak for more custard. The other little fellow was supposed to be dead, but he, too, soon began to look around, and these two robins became the sweetest birds we ever had on the premises.

You know how a door will slam once in a while in the house. Well, there was a good slam one morning when someone had left the screen door open and my son Jasper's pet robin had come in and was resting in what we call the cold storage—a room in the front of the house which is sometimes called the front 'parlour.' Here he was on Mother's picture, and the broom was going smartly after him. Jasper came with a tin and carried friend robin out to safety. That is how we get enjoyment out of these things.

Do birds come back to their homes? How many times I have been asked that question. Oh yes, they come back. "Well, how do you know, Jack?" Then you would have to talk about the weather—switch the subject. But I will tell you the rest of the story.

Wild Ducks are Tamed

I hatched four wild young mallards—well, I didn't hatch them; I stole the eggs. A domestic fowl eventually hatched out four little wild ducks, and there they were, under the old hen, wilder than March hares. However, the old hen's voice soon brought them out, and several little girls began to come out from under their stepmother and look around, and eventually they would take some of the custard right in my presence. These ducks soon were so tame that the tap on a tin pan would bring them to you. They got to be quite a size and we named them, respectively, Polly, Delilah, Susan and Helen, and presented each one with an aluminium tag, on which was printed the words, "Box 48, Kingsville, Ont." The four ducks migrated on or about December 10, 1912. Dr. Rutherford, of Chatham, shot Helen at Mitchell bay, lake St. Clair. How they got to the west of us I don't know, for they started south. I suppose they had taken such a liking for me, that they started for Ohio, where I was born. On March 14, 1913, Polly came home. On March

18, Delilah came home, and on March 30, Susan, although wounded in the wing and foot, returned home. Is that not an answer to the question, do birds return to the place from whence they migrate? Well, I wanted to go down, hitch up the 'self-starter,' and go to town, so that someone would ask me, " Do birds return home?"

They migrated that autumn, and on March 14, 1914, Polly again came home. On March 21, Delilah came home for the second time. The two girls brought a Yankee sweetheart with them and raised families the next year; and it is interesting, when they are arriving, to see the ducks come down and try to coax their new mates down too.

Well, they migrated again for the third time. In the spring of 1915, Delilah got home first; she arrived on March 13, and Polly came home on March 16. Polly got her beak a little too far ahead, and a shot had grazed right across it and cut the side off leaving it hanging. She would just stand around with her mouth open. I got some porridge and mixed custard with it and, on the second day, I had Polly in my right hand. In a week or so I took these ducks to a photographer's, stood them on a table, brushed them down and talked quietly to them and got a photograph of them.

Returned for Fifth Time

We often make remarks about 'silly' old geese and 'silly' old ducks; sometimes I wonder what the ducks and geese are saying about us. These ducks have shied around to keep clear of people hiding in ambush for them; then they come home, and, in a few days, are eating out of our hands. Isn't that worth thinking about? Talk about loving these birds; you simply can't help it, if you are human. Polly said: " I am going to stay with you, Jack, from now on," and she stayed with my hens in the winters of 1915 and 1916. However, in the spring of 1916, she was shot, but Delilah migrated and got back on March 5, for the fifth time; migrated again and got back in 1917 on March 25, and, last spring, she came back for the seventh time on March 19. Do birds return to their homes? I know that it was the same tag she had on, because my wife and I took it off her leg after it had been on five years, and presented her with a new tag. I am now making my tag system a little more interesting, by putting on the blank side a verse of scripture. Everybody who brings down a goose with my tag on it it gets a verse of scripture, whether he needs it or not. Mack Stewart, of Tennesee, writes: " Send me the history of this bird, or of *some other Canadian bird.*" Corporal John R. Smith writes: " White, age 23, *still unclaimed, can you help me out*"? So I took the two letters and handed them over to the ladies in our

Sunday school, and the same day one of them came back. There are ten of us in one class and we went and stamped this on our tag—"Hebrews 10, 24," (Let us consider one another).

Now where do these ducks go?

"Ask now the beasts, and they shall teach thee; and the fowls of the air and they shall tell thee."

I have caught and tagged 287 wild ducks. My home is at Kingsville, Ont., on the north shore of lake Erie, due north of Pelee island and twenty-six miles southeast of Detroit.

Line of Flight for Birds

Kingsville is the place where more fowls of the air go than anywhere else in North America, I believe. I have twelve tags from Ohio, nine from Kentucky, nine from Tennessee, and seven from Alabama. I have one from Saskatchewan, one from Alberta and several from Manitoba. I have only four or five tags from west of the Mississippi. I have them as far east as Long Island, New York, as far west as Alberta, as far south as Louisiana and as far north as Sault Ste. Marie. I haven't a tag for a wild duck north of Sault Ste. Marie, although I know they go further north.

I have nine wild goose tags from Chesapeake bay, seven from North Carolina, one from Maryland and one from New Jersey, but none between my home and the southeast coast of Chesapeake bay. Do these wild geese fly clear over to that Kingsville pond without a stop?

Now, they stay with me about two months. They come about the first of March—in fact, they have come as early as February 20, and as late as March 16—and stay until the last week in April or the first of May. We have had 25 tags returned from James bay and Hudson bay, namely, 24 from the east coast but only one from the west side of James bay—from Albany. Those 25 tags, ladies and gentlemen, are in my possession, and I am sorry I did not bring them along. The Indians shoot them and take the tags to the Hudson's Bay Company agent, I suppose through curiosity, mostly, and the Hudson's Bay agents eventually return the tags. I have 25 out of 102 that I put on; 25 have been returned from there and only 9 from the south.

Befriending Wild Geese

How did I find out about these wild geese? I have gone five miles from home before the stars closed their eyes in the morning. Wild geese were quite scarce; I went four mornings in succession and never saw one. There I lay under a blanket, just as the stars were closing their eyes, with three or four wild goose decoys out. Suddenly, at daylight, I see

friend wild goose coming, bringing his family with him. I can just see the tips of the wings begin to move—a faint hum, coming closer. Everything is pretty quiet—but my heart sinks; here are two men coming out there in the next field. It's all off; those fellows will secure the geese. But no, that old leader goes right over them—now he has passed them. There I am under the blanket—possibly it is a sheet if there is a little snow on the ground—the three corners are tied down and I am underneath it, just hidden there, with a gun ready. And the leader swings around, and, as he swings around, he calls and starts to drop his big black feet to come down. But, for some unaccountable reason, he changes his note and climbs into the air—everybody looks out for himself; and the minute he changed his note they all darted in as many different directions as there were geese—it was the danger signal. What did he see? One of my red hairs, possibly, projecting from underneath that blanket. He did not shy from the other men, but, he said: "That red-headed fellow over there killed two of my family last year." Ladies and gentlemen, two and two make four—if the wild goose knows his enemy, why wouldn't he know his friend?

Even the Boys Protect the Geese

I have only ten acres; how can I protect the geese? There are eight boys around the neighbourhood. In 1904, I said to them: "If you won't shoot at the wild geese around here, I will see that you get a chance to shoot one in the pond." In 1905, 1906 and 1907 no wild geese came. One morning in 1908, eleven wild geese came, and they had not been there ten minutes before the boys came along with their guns. I said: "Boys, leave it entirely with me; do not shoot at them for a week or two." "But," they said, "you said we could shoot them?" I said: "Boys, if you don't get the opportunity to shoot a wild goose I will give you $10 each, if you let me manage it." They said: "We don't want your money." Of course, they knew I didn't have it. However, in about three weeks, we hoisted a signal, "Go on, boys." We were behind a bank I had thrown up there. Uncle Jack was to shoot the two ganders. The boys lined up on one side and cocked their guns, and, as they raised them, I made it my business to scare the geese so that the boys could not shoot them. Bang went their guns. The two ganders got away, but five geese lay dead in the water—one for each family. I asked the boys not to shoot the others. To my surprise and delight, the other six did not stay away two hours; they came back, and stayed until the time came for them to migrate. If you get one bird to come, there is your opportunity.

The Geese Returned

Next spring, I was asked whether the geese would come back. On March 18, I heard a strange honking and I looked up and saw that they were coming—32 of them. They came down within 100 feet of us; I walked out, and they never flew away. I had the privilege of seeing them introduce their families. The boys shot 10, and that left 22 to go away. Next spring, I was asked: "When will the geese return?" They started to come on March 4, and, in less than two weeks, there were over 400 there. The boys shot 16 and let the rest go. See how our flock of geese had multiplied; we now had a flock of over 350. They started coming on February 20, and, when the first was whirling down, I counted 175 shots at him between my home and lake Erie. When the first was lighting in the pond, you couldn't see the end of the string of families that were coming.

Five Acres of Geese

I don't know whether you have experienced it, but there is nothing more embarrassing than to have more guests than you can feed. There I was, on Good Friday of 1913, with a five-acre field full of wild geese. We couldn't begin to feed them. Some of the geese must have told their friends what was not true, and had induced them to come to a place where there was not enough to eat. We brought the feed close to the house and let the tamer ones come there to eat. I was speaking at the Rotary Club in London the other day, and one gentleman asked me how I moved the birds. This was my explanation to him: If you want to move your birds, keep moving the food accordingly, and pretty soon you can put the spoon in your mouth and the birds will alight on it.

I will tell you about one family, one of a dozen interesting cases last autumn. On October 10, six geese came. By the way, we have never had over 150 in the autumn. I went out and called to these six geese, and the old gander answered. He knew me. I got twelve ears of corn, and threw one of them at him. Just as I did so the four baby geese jumped in the air, but he called them and they dropped down. Then I threw more ears of corn, and each time the same thing would happen; he would sound that low note, and every time he did so the geese would come down. By the time I had thrown the eighth ear he had convinced them that all was well, and they did not fly up any more. It was interesting to watch him trying to educate them to take the kernels of corn off the ear, but it was strange to them. He would get a kernel off and drop it down, but it was fully fifteen minutes before he got those goslings to take the corn; when they did start, they cleaned off every kernel of the twelve ears. That told me these young goslings had never seen an ear of corn before,



MOSS ON WHICH THE REINDEER LIVE, NORTHERN SASKATCHEWAN



PEASEMARSH BIRD SANCTUARY

View of portion of waterfront of Peasemarsh farm, Thornbury, Georgian bay, Ont. (From a painting

Photo, Courtesy Miss Edith L. Marsh

and that they had come all the way from Hudson bay without a mouthful and had dropped down there. The old gander had led them all the way down.

My mother-in-law's daughter and I coaxed this old gander and his five goslings into the coop and she held the door while I went in and clamped a tag on his leg. After I tagged him I took him to the door and threw him out—this same old gander that had been telling his boys and girls to eat the corn and to stay there and not be afraid. When I threw the gander out, did he fly to the lake? To know the Canada goose is to love him forever, and if there is any person in Ottawa who can tell me how that most intelligent, self-sacrificing bird came to be honoured by being called the Canada goose, I wish he would write me. You cannot show me any of his actions that one need be ashamed of, not one.

Wild Geese Came Back

To resume my story. This old gander went out, and when he was about two rods away he turned around and looked back. You could hear him calling for the rest of his family in that little catch pen. At this moment, Mrs. Miner would rather have been on the inside looking out than on the outside looking in, because, as I was catching Number 2, the gander came right back to the door and tried to break in and get at me. We are talking about the same bird that I tried to get a shot at three fields away; here he is now fighting to get at me to protect his young—trying to get his young out. He didn't leave that door until every one of his family had been liberated; he stood right there and fought for them. We caught him the second time, put a cuff on each leg and named him "Sir John Moore," and we put on the tag this verse of scripture:

"No good thing will He withold from them that walk uprightly."

They migrated as usual, and, on March 17 following, the boys said "Look, Dad," and there was Sir John Moore looking for more corn, with the two cuffs on his legs. Five of his family had returned; he had taken care of them down in the southern states all winter, and brought them back. The last week in April they disappeared and my heart sank when I opened a letter from Fort George, James bay, and found four of the tags. The letter read: "The Indian says that seven geese came into their decoys, and they killed four of them. Each one had a tag on it." You know just how I would feel, although that is part of the game. To the fellow who wants to shoot, let me say this: I am not opposed to a man shooting a bird or two, but will you not join with us in limiting your bag? Remember, the bird that falls out of the air from our deadly aim gives you and

me a little pleasure, but deprives thousands of people of pleasure and recreation in seeing it alive. Let us consider that; let us think it over.

Effect of Protection

Delilah raised during the six seasons, five families, two of eight, and two of nine, and, this year, she came home with twelve. What does game protection mean? Protect one duck, and you can quickly figure out what the total increase in six years will be. Delilah returned for the sixth time and raised these five families. I have not seen her since August.

The Canada goose is the most faithful and self-sacrificing bird on earth. I kept one for four years, and I know. I kept old Jack Johnson for two years and a half, but I got rid of him. I wouldn't keep a wild goose or gander around the premises after he had lost his sweetheart; they just keep on honking in that sad way. But the poorest principled piece of live flesh in feathers is the drake; he is nothing but a Brigham Young, that's all.

Dr. Murray: I think you will agree with me that we have heard something very much out of the ordinary this morning; Mr. Miner's address has been the embodiment of red hot enthusiasm. I think it can be well understood how Mr. Miner—I beg his pardon, Jack Miner—and his "mother-in-law's daughter" live a very happy life among the birds they love and that love them. Some exceedingly interesting things have been brought to our attention by the lecturer, perhaps not the least interesting being the different standards of morality existing between the goose and the duck. The goose, apparently, might be held up as a standard for the human race.

Feeding the Birds

Mr. Miner: The question has been asked me if these geese all migrate. They do, this is only a stopping place for them; they are never there in the winter or in the summer. Someone enquired whether I supplied all the food? You have all noticed that the poorer a man is the more dogs he keeps. As a matter of fact, I got what we call "cold feet." A hard-working man, with no advantages, you understand—what could I do? Just at that time my particular friend, who is to speak this afternoon, Mr. John Burnham, of New York, invited me to go to Buffalo and to meet some of his friends there. I went, and they found out what I was doing. Before I left the building that night, they donated $125 to help feed the birds, and New York state that winter carried the feeding right through. A gentleman of New York state sent me enough money to feed the birds, but last spring costs got pretty heavy. Geese were lowering, feed was soaring, and I fed

them out of my own pocket over $600 worth of feed during the months of March and April. Our Ontario Government gave me $100 and I accepted it.

MR. JAMES WHITE: I asked Hon. Mr. McDiarmid, Minister of Public Works for Ontario, who is also in charge of the Department of Game and Fisheries, to do something in this matter, and we hope that the estimates of the Province of Ontario, when brought down, will contain an item sufficient to recompense Mr. Miner for any expenditure that he may incur in feeding this wild game.

MR. MINER: Don't think that there are any hard feelings at all. I am glad as it is; I wouldn't undo it for $5,000. We have demonstrated what a man with no natural advantages and very limited means can do alone; what can the people of North America do for these God-given creatures with their combined forces? It is not what we can have; it is what we will have. We want bird protection and we are going to have it.

A Farm Sanctuary

BY

EDITH L. MARSH

Peasemarsh Farm, Thornbury, Ont.

PEASEMARSH Farm has always been a favourite spot for birds, situated as it is on Georgian bay in the Blue Mountain district, Grey county. It consists of about 300 acres of land, comprising upland, with orchard, good arable farm land and rough pasture, which forms cover for birds, and lower portion, comprising pasture, swamp and bush and open bush along the Georgian bay, both wooded with birch, cedar, hemlock etc., forming excellent cover for grouse and other wild life. With a spring stream on one side, which rises and empties within the property, and the Indian river on the other, ponds for fish and wild duck could be made. One important feature of the property is that it is situated in the midst of an agricultural and fruit-growing district, and the increase of insectivorous birds is of the greatest practical value. As a considerable acreage of the property is in crop and orchard some record can be kept of the benefit of the increased number of insectivorous birds.

Birds Always Considered

Ever since the founders of Peasemarsh acquired the property, birds have been appreciated and have received as much protection as it was possible to give them. Clumps of trees and bushes have been left in various places, old rail fences have been preserved as far as possible, and a thicket has been left in the centre of the orchard in which have nested the black-billed cuckoo, indigo bunting and many others. Below the bank a large area of some fifty acres has been left in its original state of bush and swamp, where birch, pine, cedar and hemlock grow in profusion. It is an ideal place for grouse, and, at one time, they were very numerous. Wild ducks were also numerous in the sheltered bay at the lake front. However, as wild life became more rare it was difficult to protect the game birds and other large birds, such as the heron and bittern, and also desirable four-footed wild life.

Given Government Protection

About two years ago the owners requested Ontario Government protection. Fortunately, this was granted. Professor J. W. Crow, of the Ontario Agricultural College, Guelph, visited the property and made an official report of the advantages of Peasemarsh farm as a wild life reserve. In the autumn of 1917 government notices prohibiting shooting on the property were posted by Mr. Ely, who was much interested in its possibilities for game birds, especially grouse.

Observation, Work and Results

The experience obtained as a result of protecting the birds in this sanctuary may be of interest to others who are endeavouring to carry on the same work in farming districts. It has been found that safety and suitable nesting places will invariably attract the birds. On some occasions nesting places have been made by the pruning of the bushes—for instance, cutting back a limb of a tree, so that the suckers grow up all round it, forms a favourite place for robins to build nests. Hollow trees and stumps left standing have kept bluebirds, flickers and other woodpeckers nesting on the property. To increase the number of such birds, and bring them nearer the house, nest-boxes have been supplied. The most successful are those made most like their natural homes, such as a section of apple-wood cut off in pruning, or of a cedar log hollowed out in the centre if possible in the form of a flask. The opening should be bored nearer the top as most birds prefer the seclusion of a deep home and the dimensions should be the same as those the birds hollow out for themselves. In an old apple tree in which the flickers nested the entrance they had made was round and measured exactly two and one-half inches in diameter. The roof should project over the opening, giving the shelter from storm which, in hollow trees, they get from the branches or the tree trunk itself, as they are sure to select holes on the under side. In hanging these boxes suggestions have been obtained from examining natural homes of birds in the hollow trees in the woods. The nest should have seclusion and protection from wind but not too much shade. It has been found that, even though a look-out be kept for bird enemies, the trees on which nest-boxes are hung should be protected so that four-footed enemies cannot ascend; they should be hung either on isolated trees or on posts.

Our experience has been that, as the number of birds increases, the natural enemies of the birds also increase, and that a sanctuary should not be established unless the owners are ready to give the birds all protection possible and to preserve bushes and trees that afford them seclusion and cover. The song-birds are preyed upon

by hawks, owls, weasels and vagrant cats, while their nestlings are constantly in danger, not only from these but from crows, blackbirds, red squirrels, etc., so that, unless time and attention be given to their protection, birds will rapidly decrease, as they are doing in many parts. The work done at Peasemarsh sanctuary shows the uselessness of establishing a bird sanctuary unless every effort is made to keep down vermin. One of the most difficult problems has been the keeping down of European sparrows, as grain about farm buildings attracts them from other places.

Though Peasemarsh has no warden, the owners have given as much time as possible to bird protection, and have observed considerable increase in the bird population. Now that the Government notices prohibit the gunner and his dog, it is hoped that the game birds will also increase.

Dr. Howard Murray: We have another very interesting paper on the programme this morning. The gentleman who is going to speak now is Mr. John B. Burnham, President of the American Game Protective Association. We are fortunate in having Mr. Burnham with us. His presence is appreciated at this conference. He is no stranger in Canada, but is very well acquainted with the big game of our country—probably better acquainted with it than a good many of our own sportsmen—so that he is well qualified to speak with regard to its preservation.

The War and Game

BY

JOHN B. BURNHAM

President, American Game Protective Association

THE total death casualities of the war have been estimated by U.S. Secretary of War Baker as 9,000,000 men. The total population of the world is, I believe, something over a billion and a quarter souls, so that the world lost something like seven per cent of its population. But reproduction was going on all the time, and the world has more people to-day than when the war began.

Audubon once estimated that a single flock of passenger pigeons which he saw contained more birds than the total population of the world, yet, only a few decades later, there were no passenger pigeons. The race had been annihilated.

The comparison is interesting, for it illustrates the fact that the human being is the most hardy game animal of all. The greatest war of history not only failed to annihilate, but also failed to stop man's increase. Also it must be observed that, while humanity is increasing, game is decreasing. The ratio between man and the game he hunts is constantly assuming a more unfavourable percentage as regards the game. And the war itself, paradoxical though it may be, has, in many places and over large areas, accentuated the disparity.

Effect of War on Game

Almost everywhere except in North America the food shortage has caused appalling inroads on the game supply. In England, the honorary secretary of the English Game Guild tells me it will take at least twenty years to get game back to anything like normal abundance. The great increase in vermin, with the gamekeepers off to the war, is partly responsible for this. In Russia many of the finest preserves have been ruined and game nowhere exists in its former supply. In France, the poison gases have completed the work of destruction. The Mexican bandits, in their mountain retreats, have converted magnificent game sections into unproductive wastes.

Carl A. Preley says that the war has taken a toll of from one-half to two-thirds of African game in the sections where there has been

fighting. Much of this game, he says, was wantonly slaughtered by the Boers for rifle practice. Aside from the northern portion of North America the picture is one of nearly universal gloom, but here, I am glad to say, conditions are much brighter.

Both Canada and the United States have wonderful food supplies, and, what is more important still, an exalted brand of wisdom with regard to their natural resources. In both nations, the full meaning of the value of the conservation of wild life is at least recognized. This was never more clearly demonstrated than by the passage of the treaty for the protection of migratory birds which to-day unites our two countries in brotherly bond, and which was ratified by your country during the darkest hours of the war.

Food Value of Game

Neither country for a moment lost its good sense. In the face of the clamour for cheap food in the form of marketed game, efficient protective laws were in no way relaxed. Both countries knew that, if the demand were granted, it would mean the annihilation of the game without any appreciable benefit, for the price of food would not have been lowered by any fraction of the medium of exchange. To-day, both countries have more game than when the war began—game which is of far greater value from the standpoint of making by the taking, men and soldiers, self-reliant and healthy individuals, than it can ever be for food alone.

I have seen it stated that, of the first contingent which Canada sent to the war, 75 per cent were sportsmen. After the proof these men gave of splendid valour and efficiency no further argument is needed in support of game protection. If such men are bred and vitalized by any sport, then it is sacrilege to endanger that sport. Thank God, the officials who have been responsible for the preservation of the game have been true to their trust.

Just one word of caution here, which must be taken at its relative value to the whole subject. The tendency to-day is toward too much restrictive law. We must not let the tail wag the dog. Conservation of game is right, but the conservation of sport is righteous.

Restrict the Market Hunter

Next to the advance of civilization, the chief factor that has reduced our game is the market hunter. Almost everywhere we have put an end to the commercialism of game, with the result that game is on the increase. The low-water mark in many places has been passed. We have the laws and the machinery for putting them into effect. From my viewpoint, we now need better enforcement of existing laws rather than additional restrictions, which are

only exasperation to good sportsmen. Where the law is not thoroughly enforced, you and I know that such restrictions penalize the best class only and that the others do as they please. Laws, as a general rule, should not be enacted too far in advance of public sentiment.

Close seasons are worse than useless unless they are enforced, and the vermin kept down. I say they are worse than useless, because they do not increase the game, while they do increase lawlessness and disregard for other laws. In the United States, antelope and mountain sheep have been exterminated under long closed seasons. In this instance, it is true there were closed seasons, but they should have been enforced. It would be much better to lose the game without law than to lose both the game and respect for law at the same time.

Game Laws not Enforced

Last Friday night, at the dinner of the Canadian Camp in New York, a member of the Legislature of a Canadian province told how generally game laws were violated in his province. North of this city, in time past, I have seen beaver skins openly trafficked in, while the beaver were nominally protected by a close season. There were plenty of beaver and the people could not see the necessity for protecting them. At Fort Yukon, Alaska, they fed dogs on white flour last winter, with moose in sight every day, but, on the headwaters of the White river, men were taking dogs to board and feeding them on mountain sheep. All you gentlemen, whether from Canada or the United States, could multiply such instances.

We know that we do not enforce our laws properly anywhere; that is nothing to be surprised at. All of us believe in the decalogue of the ten commandments and we would not repeal them, if we could; yet they are violated every day. All we can do is to obtain a better brand of enforcement. We can go ahead and stop a great deal of this violation; meanwhile, do not let your laws run ahead of public sentiment.

Do not spring your law, no matter how good, until you are prepared to put teeth in it. Better err on the side of too great liberality than err in the other way. Educate the public to see the necessity for protective legislation. The great mass of testimony proves that paper laws play into the hands of the Huns of sport. Let us, by all means, have fewer restrictions and better law enforcement.

Effect of Migratory Bird Treaty

In the United States, we feel that the situation as regards the future of the wild fowl supply for the present and future is now amply safeguarded by the

Migratory Bird Treaty Act. Though of not nearly so great importance as our treaty with Canada, we hope within a reasonable time to secure similar relations with Mexico. The wild fowl supply has certainly increased tremendously in the last few years, and I say this, despite the fact that, on our side of the line, the shooting season just past was, in many parts of our country, the poorest we have had in forty years. This was due, of course, to the unusual mildness of the weather. It indicates that, under normal conditions, we will have a very fine season next year.

In general, the States are looking much more closely than ever before to maintaining their supplies of localized game. A business-like feature towards this end which is receiving much attention with us is the game census. In many states, the new hunting licenses require, in addition to the usual facts, a report of all game and fur-bearing animals and vermin taken during the previous year. The killing of vermin is encouraged. This is being supplemented by estimates of the game animals and game birds at large in the covers. It is a business proposition, this inventorying of resources, and it furnishes a business basis for new regulations. I look to see the system greatly perfected in the United States and Canada during the next few years.

Then, too, we are doing a tremendous work in the United States in propagating game, chiefly deer and pheasants, to stock depleted sections. The States, in the aggregate, are spending a good many hundreds of thousands of dollars in this way for the benefit of the sportsmen. Looking to the day when wild fur-bearing animals will be less numerous than at present, the United States Government, under the direction of Dr. Nelson's department, has established an experimental fur farm in Northern New York.

Migratory Birds Convention

DR. MURRAY: The first subject for discussion is the Migratory Birds Treaty, of which so much is expected in the way of protection of our birds. Perhaps Dr. Hewitt will open the discussion.

Enforcement by Provinces

DR. C. GORDON HEWITT: I was hoping that Mr. Harkin would be sufficiently recovered from his illness to open this discussion on the Migratory Birds Convention, because now I feel that the matter is out of my hands. The enforcement of the Migratory Birds Convention Act has been placed under Mr. Harkin's direction, and will be administered by Mr. Harkin's branch. The regulations under that Act have been passed and are now in effect. As I said in my introductory remarks yesterday, the intention of the Dominion Government has been largely to rely on the enforcement of the Act or of the provisions of the Treaty, by provinces, where they are able to enforce them. We felt that, as the jurisdiction in this matter had been left almost entirely to the Provincial Governments, and that, as many of them had good organizations, it would be a mistake on our part to duplicate these organizations, if we could arrange a co-operative scheme to avoid so doing. For that reason we discussed the matter with all the Provincial Governments, and most of them, as a result of such discussions, have amended their provincial game laws to agree with the provisions of the Treaty. Where these amendments have not been made, we have the assurance of the Governments that they will be made. In some cases the Provincial Governments lack full and effective warden services; in such cases it is hoped that these warden services will be implemented by the appointment of officers under the Dominion regulations. Of course, in any province which fails to carry out the arrangement that has been suggested, the Dominion Government will be entirely responsible for the enforcement of the regulations. Thus we hope to have the whole system working very smoothly, with no conflict of jurisdiction or ideas.

Co-operation of Provinces

One of the respects in which we felt that this Conference would serve a useful purpose was that it would give all the provincial delegates an opportunity of discussing among themselves and with us the Migratory Birds Convention Act. While the convention itself may be discussed, we can hardly expect to do much in the way of amendment at present,

though there are certain points which experience has taught us it would have been preferable to have a little different from what they are now. These points can be brought out; but it is chiefly with regard to methods of administration and co-operation that the discussion should take place.

As I have said, we have already discussed the convention individually with the different governments; we now think that a general discussion on the part of the representatives of the governments among themselves and with us would lead to a much better enforcement of the regulations, to a better understanding of their significance, and, in general, to a better carrying out of the provisions of the treaty, which, of course, is what we all have in mind.

As I pointed out yesterday, this treaty, to us, is not a scrap of paper; we regard it as being one of the most important enactments, if not the most important, that has been placed on our statute books for the conservation of wild life. We welcome discussion on the part of the various members, officials, and delegates from the provincial governments or from other organizations—indeed, from anyone. Possibly, Dr. Baker, who has a very great interest in the Migratory Birds Treaty, will open the discussion.

Dr. A. R. Baker: When this Migratory Birds Treaty was first brought to the attention of the sportsmen of British Columbia, there was great opposition to it—as a matter of fact, I took the platform in opposition to it—and petitions against it were circulated all through the province. Between 4,000 and 5,000 signatures were presented to Hon. Mr. Bowser, who was then Attorney General of British Columbia, and I believe that he took the matter up at Ottawa. We made quite a fight against this treaty; the reason was that it had never been properly presented to us, and the sporting men of British Columbia felt that they should administer their own affairs relative to the game of the country.

British Columbia Strongly Favours Treaty

I am very glad to say, however, that there has been an entire change of heart in British Columbia, relative to the Migratory Birds Treaty.

Last July, the Vancouver Angling and Game Society, of Vancouver—which is the representative sporting men's association of British Columbia—passed very strong resolutions condemning this treaty, especially with regard to the three and one-half months' season for migratory birds. They sent a representation to the Government at Victoria asking them to instruct the Conservation Board not to pay any attention to the regulations that were promulgated. At the first meeting of the Conservation Board, held in

Victoria on July 29, we had the sportsmen there, and we simply said to them: "Now, we believe this is a good thing for British Columbia. There may be some things in respect to which we cannot see eye to eye with the people at Ottawa, but we believe that, on the whole, it is a good thing for the conservation of migratory birds of our province, and we are going to force you to live up to it." Two nights before I left Vancouver, the Vancouver Angling and Game Association held the largest meeting in its history in the Hotel Vancouver. I will read you the resolution that was passed at that meeting, showing that the sportsmen of British Columbia, during this last winter, have realized that the adoption of this treaty was to their benefit and to the benefit of all the sportsmen of the province. I quote the following letter from the Association to which I have referred:

February 10, 1919

Dr. A. R. Baker, Vancouver, B.C.

Dear Sir,—At the Annual Meeting of the Vancouver Angling and Game Association, held on the 4th instant, you were appointed to represent the Association at the National Conference on the Conservation of Game, which is to be held at Ottawa on the 18th and 19th instants, and this letter will authorize you to express the views of our Association on the various subjects which may be discussed, and more particularly on the question of the Migratory Birds Treaty.

The following was the resolution dealing with this matter, which was carried unanimously:

> "That this Association appoint Dr. Baker to represent them at the forthcoming Conference at Ottawa, and we are unanimously of the opinion that the duration of the period for shooting migratory game birds in British Columbia should be left entirely in the hands of the Provincial Game Conservation Board, but that, in the event of the open season being $3\frac{1}{2}$ months in each year, the opening date should be fixed by the Provincial Conservation Board."

The Association also went on record as being in favour of a three and a half months' season for British Columbia, provided that the time of opening the same be fixed by the Provincial Conservation Board.

Less than a year ago, this same association condemned the Migratory Birds Convention Act, and now they come forward with a resolution endorsing the open season of three and one-half months. You

can see, therefore, that there has been a wonderful change of heart amongst the sportsmen of the coast.

The next important representative body of sportsmen in British Columbia is the Vancouver Gun Club, Limited. About a year ago they held a meeting in Vancouver, at which they very strongly condemned the action of the Dominion Government in forcing upon the province this time limit for migratory birds. At their annual meeting in February, the following resolution was passed:

"That Dr. A. R. Baker, Chairman of the Game Conservation Board of British Columbia, act as their representative at the Game Convention to be held at Ottawa on February 18, 1919, and that this meeting put itself on record that it is unanimously in favour of the wild fowl shooting being limited to a period of three and one-half months, as provided by the Migratory Birds Convention Act."

It will be seen from these resolutions that the sportsmen of that part of the country have come to realize that the cutting down of the season is the best thing that could have happened to British Columbia. Of course, they have been accustomed to having five or six months' shooting in the year. I am very gratified, indeed, to know that the sportsmen have so readily come into line to help conserve the game of the country.

DR. HEWITT: Dr. Baker did not say that the position in British Columbia, as represented by those very strong condemnatory resolutions which were sent to the Dominion Government about the treaty, was largely due to the fact that the people had been misinformed as to the provisions of the treaty. We felt confident that, when the provisions of the treaty had been properly explained to them, they would fall in line, because the sportsmen of British Columbia are among the best-thinking sportsmen of the Dominion. Our anticipations proved to be correct, as is shown by the resolutions which Dr. Baker has read. The Federal departments are indebted to Dr. Baker for the strong stand that he has taken in these matters and for the assistance he has rendered in placing the treaty in its proper light before the sportsmen of British Columbia.

Spring Shooting in Alberta

MR. BENJAMIN LAWTON: Not much greater praise can be given to this treaty than has been given by Dr. Baker. I may say, however, that, for some twelve years, spring shooting in Alberta has been prohibited by law, with the exception that the shooting of wild geese has been allowed. We had an element which insisted that they should be permitted to shoot wild geese in the spring of the year,

and the passing of this treaty at once enabled us to enact legislation prohibiting the spring shooting of wild geese.

I have heard of no opposition from any quarter to the Migratory Birds Treaty, nor did I hear any even when it was first mentioned as a possibility. It is the greatest move toward game protection that has ever been made on the North American continent. There are one or two things in connection with the Federal law ratifying the treaty on which we are not quite clear, but undoubtedly they will be cleared up to-day. One of these points is the position in which provincial officers will be placed in regard to the enforcement of the law. Before this conference disperses, I think that those who are responsible for putting this treaty through, and working it up to the stage where it was acceptable to all the provinces and to the great majority of the states of the union, should be commended on their work.

Destruction by Birds in Alberta

MR. F. BRADSHAW: I am pleased to say that the game laws of Saskatchewan, at the time this question was first brought to our notice, were so nearly in accord with the provisions of the treaty that it was necessary to amend them only in two respects. One was with respect to protecting the cranes; the other with respect to protecting the swans. In Saskatchewan, the cranes are found probably in the greatest numbers, and, in certain districts, chiefly between Last Mountain lake and the Quill lakes, they are very abundant during the harvest season and do an immense amount of damage to the crops. Some people are apt to pooh-pooh the idea that wild game do damage, but I have seen grain fields in these vicinities that were completely threshed out by the cranes and ducks. Naturally, the farmers have a grievance in that respect, which we have to meet; and there is a provision in our Act for the granting of permits to kill these birds where destruction of this kind is taking place. But, as I understand it, the treaty is the supreme law, and it is necessary for us to appeal to the Minister of the Interior for permits to relieve the situation. The farmers at that particular season are very busy, and have no time to write to Ottawa and wait till an investigation has been made and a permit forwarded, and so on; they want immediate action, and we must find some means of overcoming that difficulty. Aside from those two points, we have found the treaty to work out to the satisfaction of the sportsmen of our province, and I think it is the best legislation that has ever been enacted in the cause of game conservation.

DR. GEORGE BRYCE: I have been away from Manitoba for four months, but, having been a member of the committee that dealt with

this question, I have always taken great interest in it. Our Attorney General has never been able to come down here; we have tried to get him several times. In this enactment we have a most important law affecting the passage of game from north to south. In the Red River district and from lake Winnipeg northward, large numbers of migratory birds pass up and down. As far as I know, the Government is trying to carry out the law thoroughly. A great many prosecutions have been made for infraction of the law; the magistrates throughout the province are instructed to carry it out strictly. It is one of the greatest sights in the world to see the birds returning in the spring, darkening the whole sky in their passage from Louisiana away up to the north over lake Winnipeg, and to see the air full of ducks and geese in the autumn as they proceed towards the south to find their winter resting place. No part of the country needs this law more, and to those of us who have had something to do with it, it is gratifying to see the results that it is bringing about.

Snow Geese do Damage

Mr. Criddle (Manitoba): I do not think I can add very much to what has been said. Manitoba has practically had on her books for some years the law that we are discussing, except that we did not protect the geese and cranes. Mr. Bradshaw brought up an interesting point with regard to the destruction of crops. We have had that complaint in Manitoba, especially in some parts of the north, and in some districts frequented by the snow goose. The snow geese sometimes come in very great numbers, descend on the crops just as they are appearing above the ground, and literally tear up everything. That is a great objection, although, fortunately, the depredations are limited. Whether or not it would be necessary to compensate the farmers for this damage in local spots, I do not know. Otherwise the Act worked out splendidly; I never heard a single word of objection to its enforcement.

Mr. James White: Does that damage ever occur when the weather conditions are not such as to drive the geese down to the ground?

Mr. Criddle: The snow goose is a late migrant; it does not come until quite late in May, when there is an abundance of food; but the sprouting grain is probably more tempting to it than any other food. As I say, the damage is only local, and does not occur every year.

Ontario Passes Uniform Legislation

Mr. G. H. Rapsey: I have very little to say other than that Ontario is heartily in accord with the treaty and that the province will do all in its power to enforce the law through its regular officers. Last year we passed an



VIRGINIA DEER AT BANFF, ALTA., FAIRHOLME RANGE IN BACKGROUND

Photo, Courtesy Mr. Dan McCowan



SHEEP ON NATIONAL HIGHWAY, NEAR BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan

Act designed to cover the provisions of the treaty, and I understand that some minor changes are to be made to bring it more fully in accord with the provisions of the convention.

Dr. Hewitt: We are glad to have with us Mr. Chambers and Mr. Bellisle, of the Department of Colonization, Mines, and Fisheries of Quebec. We are sorry that Hon. Mr. Mercier is not here, because he and his department played a prominent part in the early days of the negotiations to bring about this treaty. In fact, I think the province of Quebec made one of the first official moves—in a sense, it was not official, but it was officially inspired—in the direction of securing this treaty. For that reason we should very much like to have a few words from Mr. Chambers and Mr. Bellisle.

Conflicting Authority

Mr. E. T. D. Chambers: The difficulty which presented itself in the province of Quebec was the old one which, in every part of the continent, has existed for many years—the misunderstandings between central and state powers, federal and provincial parliaments. There is no doubt that central powers are apt to encroach on other powers. In our province we have an illustration of that in the fact that the municipalities are complaining that the province is taking away their revenue. In many cases the provinces are jealous of their own powers, but, whether with or without reason, they have been more or less jealous of the Federal powers. I felt, therefore, that there might be some little difficulty in getting the necessary consent of the province of Quebec for the enactment of Federal legislation in this matter. But the difficulty was overcome for us through the fact that the legislation proposed under the treaty required us to make scarcely any amendment of our existing laws. I remember the time when spring shooting of ducks was permitted in our province; happily that was done away with years before the passing of this treaty, when Hon. Mr. Parent was at the head of the Department of Fish and Game. The fact that very few amendments were necessary made the securing of the consent of the province a comparatively easy matter.

One or two minor details in the Act may yet require to be amended. There is just a little difficulty with regard to the translation of the names of certain birds. We are anxious that that be put right at the earliest opportunity; then we shall be in full accord with the Act as it now stands.

Mr. J. A. Bellisle (Inspector General of Fisheries, Quebec): I have really nothing to add to what Mr. Chambers has said as to the enforcement of the law. We have about 200 guardians in the province and are doing our best to enforce the law, not only with

respect to migratory birds, but also in respect to big game and fur-bearing animals. We are doing our best to preserve the wild life of our province.

Protection of Game Birds in New Brunswick

Dr. E. A. Smith (Minister of Lands and Mines, New Brunswick): I quite agree with all that has been said with regard to the legislation ratifying the treaty for the protection of migratory birds. Unquestionably, we wish to conserve our wild fowl and other migratory birds and to protect them on their way to the nesting grounds.

The Treaty Act, as passed, was exactly the same as the law which we had in New Brunswick pertaining to the migratory water-fowl, except that there was a saving clause for the poor fishermen who live along our coast. This was in order that they, like the Indians, might shoot some of these birds in their northern flight for their own use.

When we were notified, in 1917, that this Act had passed Parliament, I thought that the best thing we could do was to eliminate from our game laws the provision to which I have just referred. I thought that would be proper. I will not say that we will not do it at some future time; personally, I consider it the proper thing. But there is this that we have to consider in New Brunswick; we have very little money at our disposal; we are like the business man who can hardly afford to touch anything that he cannot get some little return from. Protecting those birds would cost the province a good many thousands of dollars for wardens. On the face of it, it might appear that, under our forest service, the same wardens could protect those birds in their flight. That is not so; we have no wardens in the coastal area, as the Dominion Government protects and regulates the fish along the coast. I do not want to undertake anything that I cannot carry through.

Fishermen Depend upon Game for Meat

The spring shooting in our province does not amount to very much. The settlers take strong exception to this Act, because all along our north shore we have fishermen who are not wealthy, who depend upon fishing, with a little bit of farming, for a living These men do not see meat every day, as many other people do; they do not see meat oftener than once a month, perhaps, and they have had the privilege under our Act of shooting birds which some people do not consider edible. I refer to the sheldrake or merganser and the coot. I am sorry that these birds were not left out of the treaty. A bounty is paid on the sheldrake in connection with the leasing of our salmon rivers, because they are the greatest known destroyers of young salmon and trout. Mr.

Mowatt, superintendent of the Restigouche river, told me last year that he had ki'led a duck which contained no less then eighteen parr, or young salmon—and they have put a bounty on these birds. They nest up the rivers and bring forth large flocks, and the lessees of our rivers for fishing rights are put to expense in killing them off. I am sorry, therefore, that the sheldrake and the coot were included with the other birds in this treaty. I suppose that, in the western provinces, the sheldrake is not found in the areas where agriculture is carried on.

Mr. A. Knight (Chief Game Commissioner, Nova Scotia): Not very many changes were necessary in our law in order to make it conform to the Migratory Birds Treaty. We have protected our shore birds, the black duck, for instance; for many years, we have had a close season for the wood duck and the eider duck.

Non-migrating Geese in Nova Scotia

Our position with regard to wild geese and sea ducks is a peculiar one, somewhat similar to that of New Brunswick. Our fishermen have been in the habit of shooting these sea ducks as they pass the islands along the coast, and I am afraid it would be difficult to enforce the law with regard to these particular birds unless we had a number of wardens there. Perhaps we are the only part of Canada where the wild geese winter—I refer to the south shore of Nova Scotia, where there is a district frequented by the wild geese in the winter season. As I said yesterday, these wild geese are larger than those which come from the south and different from them, perhaps, in other respects. There was a certain amount of opposition to the regulations passed by the Government last year, because special provision was not made for that section of the country, as could have been done without violating the treaty. Some people took the ground that, as these birds never visited the United States, the treaty should not cover them—the United States was not interested in them. It was pointed out to them that we are bound by the definition of migratory birds as given in the treaty, and that is certainly wide enough to cover these wild geese.

However, when the question came up of making our law conform to the treaty, not many changes were necessary, but the close of the session of the Provincial Legislature was near at hand, and there was so much difference of opinion on some points, particularly with regard to the season for wild geese and sea ducks, that the matter was left over. I took the responsibility of advising the committee that, if they could not make the provincial conform exactly with the Dominion regulations regarding these particular birds, they should omit them from our Act. I urged that no season be enacted that will conflict

with the treaty or with the Federal regulations. That was done, and I hope that the matter will be completely adjusted this year.

We have never found it necessary to protect the wild geese that winter on our south shore. They have not been decreasing; they are pretty well able to take care of themselves. We have a small sanctuary for them there, covering part of their feeding ground; that is the only measure of protection we have ever found it necessary to extend to the wild goose. As to the regulations regarding these birds, a special season could be specially established for that section only, where the geese winter, giving the people the winter open season up to the 10th March instead of the autumn open season. That would be quite in line with the provisions of the treaty.

DR. MURRAY: Perhaps Mr. Nelson would give us some information as to how the difficulties in the United States have been met.

MR. E. W. NELSON (Chief, Bureau of Biological Survey, United States Department of Agriculture): One of the pleasures I anticipated at this meeting was to have the opportunity of expressing my appreciation of the helpful courtesy which I have experienced in my dealings with the provincial game wardens of Canada. As a result it has been a pleasure to do business with the gentlemen connected with the game-protection service throughout Canada.

International Co-operation

The Biological Survey, as you all know, is entrusted with the enforcement of the Federal game laws. In addition, it has a scientific staff which is engaged in collecting specimens of game and other birds and animals for the purpose of studying and monographing the little-known groups. In many instances it has been necessary to apply for special privileges to secure specimens of various game birds and animals in different parts of Canada, and in this we have been most generously treated. We have also had the privilege of securing from Alberta a considerable number of antelope for stocking some of our Federal game preserves. I am glad of this opportunity to put on record my high appreciation of the courtesies the Biological Survey has received in all such matters.

Damage to Agriculture

In handling the Migratory Bird Treaty Act we have found that Section 7 of the Treaty, which grants permits for the destruction or control of birds doing damage to agricultural crops or other interests, is one of the most important sections of the treaty. This was illustrated in the autumn of 1918, when the ducks in large numbers came down from the north and entered the rice fields of California. Rice growing is becoming a large industry there and loud complaints were made of the damage by these waterfowl. The rice growers estimated that in the year

1917 wild fowl did damage amounting to about $1,000,000. This was undoubtedly an exaggeration, but there is no question that serious damage was done. A part of the outcry against the birds was due to the desire of sportsmen, market hunters, and other to break down the Migratory Bird law. In August and September last newspapers in California inaugurated a vicious campaign against the Migratory Bird law. This outcry was taken up by the papers of San Francisco, Sacramento, Los Angeles, and elsewhere, attacking the Migratory Bird law and migratory birds, stating that these birds were a pest and should be exterminated. As the Game Commission of California was protecting the birds it was also attacked.

Rice Fields Threshed out

Under the terms of the Migratory Bird Treaty Act, the Biological Survey sent one of its most competent experts into the rice fields, where he spent six weeks studying the habits of the birds, and then reported the results to Washington, with certain recommendations. As a result, the Secretary of Agriculture, under the terms of the treaty, issued a permit to the rice growers in certain counties to shoot these birds in the rice fields. The permit specified that the birds should be shot by the owners of the rice fields, members of their families, or *bona fide* employees. Birds so shot could not be sold, but could be used by the men who shot them or contributed to hospitals or other public institutions. The issuance of that permit had an extraordinary effect. It pricked the bubble of the newspaper campaign, which stopped immediately. One prominent rice grower, who had been particularly bitter in his attacks on the protection of wild fowl, wrote the Biological Survey expressing his appreciation of the consideration which had been shown the rice growers and for the satisfactory way in which the difficulty had been solved. Since then we have not had a word of complaint, and the result of the issuance of the permit was that very few birds were killed in protecting the rice fields. This is an excellent example of the manner in which local dissatisfaction with the game law may be satisfactorily handled with but slight effect on the wild fowl, while at the same time gaining friends for the law.

Bobolinks Destructive

Formerly, during their fall migration, the bobolinks did enormous damage to the rice fields in the Carolinas. For many years rice growing in those States had practically ceased, but during the last two years the industry has been renewed and the bobolinks have returned to their old habits. Complaints concerning this came to us last fall and it was found after careful investigation that the bobolinks were actually doing so much damage that if their activities were not checked they would seriously

handicap, or possibly prevent, successful rice growing. Steps were at once taken to have a permit issued which would permit the bobolinks to be killed in order to reduce their numbers to a point which would restrict their destructiveness. On the few thousand acres of rice grown there during the last few years our experts reported a loss of about $150,000 annually. These rice birds proved to be most exasperating pests. If a flock of them in the rice was shot into it would simply rise and drop back again into the rice fields only a short distance away. The birds were so persistent that repeated shots in the flock would not drive them from the fields. As a consequence, in this case, it became necessary to make the permit broad enough to permit their being killed not only in the fields but elsewhere during their autumn migration.

We have had complaints of the destructiveness of fish ducks, or mergansers, to fish, particularly in the trout streams of Michigan. We are now in correspondence with the Game Commissioner of Michigan and plan to have competent ornithological experts study the habits of these birds on the ground to ascertain the facts. Wherever these birds are doing really serious injury to the fish supply it will be necessary to withdraw protection from them. I do not believe that we are justified in protecting a bird where it is so destructive that it becomes a public nuisance. We have found that treating cases of this kind in a fair and open-minded way gains friends for the general protection of birds.

Migratory Birds

Another question has arisen in connection with the administration of the migratory bird law, a part of which is that of handling species which breed both in the United States and in Canada. The Canada goose, which winters in Nova Scotia, and the mourning dove of the United States are good illustrations of these. The mourning dove breeds in many States and in some of the Southern States they are present throughout the year. At the same time large numbers of these birds pass the summer in Canada. In order to effectively administer the law it is necessary to consider the species as a whole migratory in character, no matter what might be the distribution of any individual bird. This method of handling the question has been generally accepted and appears to be the only practicable way.

Organization for Enforcing Treaty

The organization in the Biological Survey for administering the present Migratory Bird Treaty Act is practically the same as that under the old migratory bird law before the treaty. For the administration of that law we had an appropriation of $50,000 a year, a comparatively insignificant

sum to provide for enforcing the law over the entire United States. After the Treaty Act was passed by Congress the $50,000 appropriation was renewed. At the same time we have had an appropriation of $22,000 to enforce the Lacey Act, prohibiting the illegal interstate shipment of game—that is, the shipment of game that has been illegally killed or illegally transported in interstate commerce. The Migratory Bird Treaty Act took over a part of the activities of the Lacey Act, inasmuch as it also deals with interstate and international shipment of migratory game birds. For the purposes of more effective administration the Lacey Act appropriation has been transferred to be administered with the Migratory Bird Treaty Act, thus practically giving us $72,000, most of which is available for this work. The Secretary of Agriculture has recommended to Congress that the appropriation for enforcing the Migratory Bird Treaty Act be increased by $125,000 for the fiscal year 1920. The House of Representatives has cut this down to $75,000, and it is now before the Senate. Senator McLean, whose work in connection with the passage of the original migratory bird law and in securing the Migratory Bird Treaty Act is so well known, is looking after this item. This would give us $147,000 for the coming year. While the sum is small for the work which is called for, yet it will enable us to accomplish much good, and we shall hope for considerable additions in future years.

The organization in the Biological Survey for the administration of the migratory bird law consists of a Chief United States Game Warden, working directly under the Chief of the Bureau in Washington, with United States Game Wardens in charge of field operations in the districts, which are made up of one or more States. We hope eventually to have at least one game warden for each State, and, in the larger and more important States, two or more. These wardens receive salaries of from $1,500 to $1,800 a year, with travelling expenses when away from headquarters. In addition, in each of the States we make Deputy United States Game Wardens of a certain number of the deputy State game wardens, paying them $1 a month to give them official standing, and $3.50 per day and expenses when actually employed in the work. These men are not to receive a total salary exceeding $300 a year. In this manner we have direct co-operation between the State game wardens and the Federal service. In addition, a certain number of men who are interested in game conservation and desire to do volunteer service may be appointed at a nominal salary of from $1 a month to $1 a year to give them official standing. By this method we expect to cover the States much more thoroughly

than would be possible with limited funds under any other plan. With the exception of the Deputy United States Wardens who receive not to exceed $300 a year, our wardens are under the civil service and are appointed through competitive examination. The men who show exceptional ability as deputy wardens will be in position to take examinations to fill vacancies and be appointed on the full-pay service.

I am pleased to say that we have the most hearty co-operation of the game commissioners of practically all of the States, and it is generally acknowledged that the Federal and State control of game will unquestionably work out much more satisfactorily than any other system which has hitherto been in existence. There will be a co-operation in control and action that has hitherto been impossible and which naturally will result in increasing and conserving the supply of game.

In addition, the U.S. Forest Service and the Biological Survey are now trying to work out a system of joint control over large game in the national forests. The idea is to have the game in the national forests administered through joint control by the State game commissions, the Forest Service, and the Biological Survey. The forest rangers in many cases now act as deputy State game wardens. They will be available to give an effective warden service for policing the national forests. It is planned that the amount of game to be killed in any forest during the coming hunting season will be decided by a joint agreement between representatives of the State game commission, of the Forest Service, and of the Biological Survey, after an investigation concerning the abundance and condition of the game in each area. The number of hunting licenses to be issued will then be issued for the number of game animals of each kind it has been decided may be killed within the area without detriment to the future of the game supply. The fees for hunting licenses will continue to go to the States. The States will thus secure the co-operation of the Government in helping build up their game supply without cost to them, while they will receive all of the benefits derived from the game in the way of license money and other advantages. One of the main objects of this plan will be to secure control over the number of game animals to be killed in each forest to prevent overkilling.

Licenses to take Big Game

Examples of the situation which it is hoped the plan mentioned above may remedy are shown in the country south of the Yellowstone park. In some areas there the elk are plentiful; in others they have been killed off until they have become very scarce. By a survey each year before the hunting season opens by representatives of the State and the

Government, the number of elk that should be killed and the number of licenses that should be issued for the purpose in each forest or in certain specified parts of a forest can be agreed upon and the licenses issued in limited numbers and effective in specified areas. Fifty licenses may be issued for a certain watershed, and perhaps five hundred for another. In places where the game has become reduced so to endanger its future no licenses should be issued until the game has had opportunity to renew its numbers. Through this or a closely similar system I believe that the game can be increased and brought back to a satisfactory level in all suitable country. The result would be somewhat similar to that which obtains on a well-managed cattle ranch. The owner of such a ranch does not go on killing his cattle when for any reason the stock is seriously reduced, but he gives them a chance to come back, and this is what we hope to do by this joint control. In the State Legislature of Washington a bill to carry out this plan was introduced during the present session, but whether it will become law or not at this session is not known. This idea is a new one and will require considerable educational work until it is understood and its effect appreciated by the States, which will be the principal gainers through its operation.

DR. HEWITT: During the discussion this morning some one brought up the question of permits, which was one of the matters, apparently, that needed further discussion. I refer to permits under the Migratory Birds Convention Act for the taking of birds for scientific purposes and for the killing of birds under article VII of the treaty, which are injurious to agriculture or other interests.

Authority to Issue Licenses

Last autumn, I discussed this matter with various game officials in the West, with a view to coming to some general understanding as to the procedure in such cases. When I returned to Ottawa this matter was reported to our Advisory Board on Wild Life Protection, and I will read you a minute from our proceedings showing the procedure that the Advisory Board suggested and which is being followed:

"The Secretary reported the results of his conference with the provincial game officers of the western provinces respecting the policy to be adopted in the issuing of permits under sections 8 and 11 of the regulations. So far as scientific permits are concerned, the provincial departments are agreeable to our proposal that such permits shall be signed at Ottawa first, and then sent to the proper provincial officer for his counter-signature, such provincial officer reserving the right to cancel a permit if he considers it desirable."

That means, of course, that the right of issuing or cancelling is really vested in the provincial officer, finally.

". . . the permit is then to be forwarded to the applicant by the provincial officer."

Which means that the provincial officer is to be kept in touch with the applicant for the permit.

"The issuing of permits for the killing of unprotected birds, when injurious to agricultural or other interests, was discussed in the light of the views expressed by the provincial departments, which feel that, in view of the necessity for immediate action in such cases, and of the length of time required in communicating with Ottawa, it was desirable that such permits should be issued by the Provincial officers, subject to subsequent ratification by the Dominion officers. As applications for these permits have not been numerous in the past, it was decided that the best policy would be that emergency cases should be dealt with immediately by the Provincial officers after a thorough investigation and that such permits should be forwarded to Ottawa for ratification with a report covering the particular case."

Scientific Permits Issued by Dominion

We felt that that was the best policy to adopt; it was the policy to which all the provincial officers had agreed in discussion with me. It gives equal rights both to the Dominion and to the provincial officers and still keeps to the letter of the law. You will see that scientific permits shall be signed first in Ottawa and ratified by the province, and that emergency permits, under Article VII, for birds destructive to agricultural and other interests, shall be issued by the Provincial Governments and ratified by the Dominion Government subsequently. We felt that that was perfectly permissible, in view of the fact that the number of applications for such permits was very small. Mr. Lawton tells me that, in Alberta, he has had only one application in twelve years for a permit under Article VII of the treaty for the killing of birds injurious to agricultural interests. In Saskatchewan, the only permits asked for were in one or two cases for the killing of sand-hill cranes; also a case where ducks were injuring wheat-fields close to waters.

MR. LAWTON: I suggest that you deal with the matter of provincial legislation under this treaty from the constitutional aspect—as to what standing the provincial law would have under this treaty as against the Federal.

Dominion Responsible for Treaty

DR. HEWITT: The Dominion is responsible for carrying out the legislation putting the treaty into effect; in that respect the Federal power is supreme to any provincial power. In so far as the actual carrying out of the legisla-

tion is concerned, we wish to do that co-operatively, and we felt that the best method of securing such co-operation would be for the Provincial Governments to pass concurrent legislation, putting into effect the provisions of the treaty, and to administer such enactment as part of their provincial game law, so that there should be no conflict of jurisdiction. In such a case, the two laws would be indentical; we have other legislation of the same kind. The province enforces it where it is able; where it is not completely able its efforts are supplemented by Federal action.

MR. LAWTON: The point I was coming at was this: The provincial legislation being exactly the same as the Federal legislation, if a charge were preferred under the Provincial Act and a conviction secured would it not be possible to upset that conviction on an appeal?

DR. HEWITT: I am not a law officer. If you raise that point when Hon. Mr. Daniels, the Attorney General of Nova Scotia, comes in, I think he will be able to settle it.

MR. WILLIAMSON: If officers of the Provincial Government took action in a case of violation of the Migratory Birds Act, and went to the expense and trouble of prosecuting, and the fine went to the credit of the province, would that not indicate that the province could take action under the Migratory Birds Act without any provincial legislation?

MR. JAMES WHITE: I do not think that quite meets the point raised by Mr. Lawton; the point at issue is simply whether provincial legislation under such circumstances would be declared *ultra vires*. There is no question that provincial legislation of that nature is wholly within their province as determined by the British North America Act; any conviction had under such provincial legislation would, unquestionably, be *intra vires*.

MR. LAWTON: Under the Alberta Act we make provision for the issuing of permits for the killing of birds for scientific purposes. Usually, such permits are asked for to cover not only the migratory birds, but the non-migratory birds as well. That would necessitate, under the present arrangement, the issuing of a provincial permit for non-migratory birds and a Dominion permit, endorsed by the provincial authorities, for the migratory birds.

DR. HEWITT: We discussed that matter at the meeting of the Advisory Board, and the permits are framed to deal with such a situation. Mr. Lloyd, who is in immediate charge of this legislation under Mr. Harkin, can explain that to you.

MR. LLOYD: The permits issued for scientific purposes on the recommendation of the Advisory Board on Wild Life Protection are worded exactly to cover the clauses in the treaty: "Migratory

insectivorous, migratory game and migratory non-game birds and their nests or eggs."

DR. HEWITT: We also put in a specific clause in regard to that matter.

MR. LLOYD: For the final form on that I have not yet received the approval of the Wild Life Board. As to the birds not covered by the treaty, I would think that they would have to be covered by special provincial permit, because they are certainly not covered by the other permit.

DR. HEWITT: It was our intention that the permit should distinctly state that it covered only migratory birds. For other birds a special provincial permit would be required.

MR. R. E. HOSE (Chief Clerk, Provincial Game Conservation Board, British Columbia): I understand that, if a permit is requested to collect for scientific purposes, it requires to be supported by two well-known ornithologists. It does not necessarily provide that these ornithologists shall be resident in the province in which the permit is to be made use of. For instance, two ornithologists might attest to a man from this province who wished to collect in British Columbia, or a man might come in to collect in British Columbia on the recommendation of two ornithologists who had never been in the province.

DR. HEWITT: That is not so much a recommendation of the man's ability to collect locally as a recommendation of his qualifications as an ornithologist.

MR. HOSE: A man writing from Queen Charlotte islands wishes to keep wild geese in captivity. He has to apply to Ottawa to get the endorsation of two well-known ornithologists, which it is practically impossible for him to obtain in British Columbia.

DR. HEWITT: Would that not be a propagation permit?

MR. LLOYD: It might be well to tell that applicant that the Canada goose propagated with the domestic goose produces a sterile progeny.

MR. HOSE: But, if he does not receive an answer, he thinks that the administration of the law in British Columbia is poor.

Co-operation in Issuing Permits

DR. BAKER: The position I take is this: If a person applies to the Wild Life Board, at Ottawa, for a permit in respect of migratory birds in British Columbia, let the Board submit that application to us for our ratification, and, if we refuse to ratify it, let them refuse to issue it, and *vice versa*. If that is done, we will avoid all difficulties; if it is not, we are likely to have quite a lot of difficulty. In British Columbia, the Provincial police have been, since July last, the guardians of the game; we have

no more game wardens. Thus, a man coming into our province from another province to take migratory birds or insectivorous birds or any other game under a permit from Ottawa is liable to come in contact with our Provincial police. We must be in communication with Ottawa so that we can notify our Provincial police that John Jones or John Smith has obtained a permit to take birds or animals in a certain section of the province; otherwise, difficulties may arise. Our implicit instructions to the Provincial police are to arrest anybody who is found to be violating the laws of British Columbia, and, if the collector of specimens for scientific purposes, or for any other purpose, has not notified me or notified Mr. Hose, the secretary of the Board, that he is in a certain locality or in a certain section of British Columbia taking game or birds for scientific purposes under Dominion permit, he is liable to arrest, notwithstanding the fact that he may produce a Dominion permit. So that we must come to some understanding with the Advisory Board on Wild Life Protection in the matter of our being notified in such cases.

DR. HEWITT: I think that point is covered by the resolution passed by the Advisory Board with regard to this question of permits. It says:

"So far as scientific permits are concerned, the Provincial Departments are agreeable to our proposal that such permits shall be signed at Ottawa first and then sent to the proper provincial officer for his counter-signature, such provincial officer reserving the right to cancel a permit if he considers it desirable."

DR. BAKER: That is absolutely satisfactory to us.

Merganser is Destructive to Salmon

MR. J. A. BELLISLE: I am perfectly in accord with the remarks made by Hon. Mr. Smith this morning in connection with the mergansers. The merganser is one of the most destructive birds we have, especially of our salmon. We have a clause in our game law permitting the killing of that bird, and, in some of our salmon rivers bounties are paid on it. I would suggest that, if possible, Article VII of the Convention be made to read in this way:

"Permits to kill any of the above-named birds, which, under extraordinary conditions, may become seriously injurious to the agricultural, fishing, or other interests in any particular community, may be issued. . . ."

It would be well, too, if it could be provided that the Provincial Minister might issue permits for the killing of such birds.

Thorough Inquiry Precedes Issuing Permit

DR. HEWITT: You could not very well put that in this Federal Act carrying out the treaty. As I read that resolution, we are endeavouring to carry this out in co-operation with the Provincial Ministers; we have decided that these permits shall require the joint action of the Dominion and the Provincial Governments. That is necessary, because the Dominion could not leave it entirely to the Provincial Governments; otherwise, they would not be carrying out the provisions of the treaty. I am speaking, of course, for Mr. Harkin, who, unfortunately, is not here. So far as the Dominion is concerned, they are willing to consider applications in co-operation with the Provincial departments. Each case will have to be thoroughly investigated on its merits; no permit will be issued without a thorough inquiry. We are following the same policy as that described by Mr. Nelson this morning in connection with similar permits in United States. As to the case to which Mr. Bellisle refers, if the fishermen in any of the salmon rivers in Quebec feel that the mergansers are injurious to their interests, an investigation should be made to show that they actually are, and no permit should be issued until such an investigation has been conducted. Under the Dominion law it is illegal for any fisherman to encourage the destruction of or to destroy mergansers at any time on any fishing river in Quebec.

DR. MURRAY: At our morning session, expressions of opinion were heard from representatives of all the provinces except Prince Edward Island with regard to the working out of the Act. It was found that, notwithstanding any opposition that might have been offered to the treaty in the beginning, it was working out in the various provinces with very little friction. Perhaps Premier Arsenault, of Prince Edward Island, who was not present this morning, would favour us with an expression of opinion as to how the Act is working out in the island.

HON. A. E. ARSENAULT (Premier of Prince Edward Island): I am sorry that I was called away during the meeting this morning. I have very little to say with regard to this matter. The treaty came before us only last spring, and I have not heard of any infractions of the law. As to how it is going to work out in the future, I have no idea.

DR. MURRAY: Any expression of dissatisfaction?

Spring Shooting in Prince Edward Island

MR. ARSENAULT: A great deal. I have had several delegations from those interested expressing their views on the subject. We have passed no legislation, and just at present, to be candid, it would be impossible to get such

legislation through the House; it would not be considered for a minute by either side. The only shooting of geese and brant in Prince Edward Island is the spring shooting. There is no autumn shooting; there is no very considerable destruction of birds; the shooting is insignificant. The expressions that I have heard have been to the effect that the legislation was designed for the benefit of the southern portions of North America. The feeling is very strong among those interested. However, possibly with a little education something might be accomplished. It needs to be explained; some pioneer work must be done. As I say, there is no autumn shooting in our province, and, if the spring shooting is done away with, it means that the people are cut out from any shooting whatever.

DR. MURRAY: May I suggest that Premier Arsenault and Dr. Baker of British Columbia hold a conference some time before the close of the day. Dr. Baker had a good deal of difficulty in his province, but he succeeded in getting it very nicely straightened out.

MR. ARSENAULT: I think we will have to bring him to Prince Edward Island.

Serious Effects in Yukon

COL. ALFRED THOMPSON (Member of Parliament for Yukon): I listened with great interest to the remarks of the Premier of Prince Edward Island. The question of migratory birds concerns us in the Yukon perhaps even more directly than it concerns any other section of Canada. We are very far removed from the markets of the world, and we produce no meats or fowl of our own; we have to import all our beef, mutton and fowl, and the result is that the wild game in the Yukon is rather an important factor in our menu, which we have supplemented by taking feathered game in the spring and autumn.

This Migratory Birds Treaty hits us very hard. Premier Arsenault has said that, in his province, it is construed as being drafted so as to favour the southern people; I sympathize with him. We are in the peculiar position in the Yukon of breeding these birds, and, because of the Migratory Birds Treaty, seeing them fly gracefully along the valley of the Yukon over our heads to our southern neighbours, who take them when they arrive in those districts. We cannot take them without breaking the law. I suppose that this phase of the question was considered by the gentlemen who drafted that treaty, before it was finally put upon the statute books of the United States and Canada.

Special Season Suggested

The Administrator of the Yukon and myself had a conference with Dr. Hewitt and some other members of the Board of which he is a member, and we pro-

posed to the Board that the season be made later for the Yukon. In the past we have indulged in spring shooting, and have taken quite a number of geese and ducks, particularly ducks. So far as the spring shooting is concerned, I have no criticism whatever to offer; I am not in favour of spring shooting in the Yukon or anywhere else. I believe that the birds should be given an opportunity to breed; I do not raise my voice to object to that. But I do submit to this meeting, with all the force that I am capable of, that we would like to have a little leniency shown in the Yukon with respect to these autumn birds. I do not care to labour the point or to deal further with the question; the facts are easily substantiated; they are as I submit them.

Climatic Conditions of Yukon Territory

May I say one word as to the topographical character of the country drained by the Yukon river, which divides and yet unites Yukon and Alaska? That great river runs through a plateau which is east of the Coast mountains, and that range of mountains has a direct influence on the climatic conditions which obtain in Yukon and in Alaska. By the way, I am prompted to say this because of the paper which was read yesterday by Dr. Hornaday, and in which I was very greatly interested. I wish to point out to the gentlemen who are within the sound of my voice to-day that, when you are considering the Yukon and Alaska, you are considering a region which has two distinct climates. The Yukon river runs towards the Bering sea, and between that valley and the gulf of Alaska there are huge ranges of mountains. The result is that the Pacific current comes across the North Pacific ocean and strikes the mountain ranges, which parallel the coast from Portland canal to the Aleutian islands. This Pacific current, sweeping through the gulf of Alaska, is laden with the moist, warm winds of Japan, and when it strikes the Coast mountains there is a tremendous precipitation; all the way from Portland canal to Valdez there is a very heavy rainfall in summer and a very large snowfall in winter. The greater the altitude, of course, the greater the snowfall. That air is dehydrated by that mountain range; hence, you have the dry belt of the interior of British Columbia and the very small precipitation in the valley of the Yukon and in northern British Columbia. In the winter months, therefore, on the coast of Alaska, around Sitka, Valdez, and other places in that district, there is hardly any frost, but a great deal of snow or a great deal of rain, depending on the season; but, inside the mountains, you have a dry, cold, crisp atmosphere, where the temperature drops to 65 and 70 degrees below zero. Nearly always during the winter there is a very cold

spell; sometimes, several cold spells. So that, in drafting a treaty which deals with this vast territory, perhaps these factors have not been taken into consideration. At any rate, the net result is that we do not get our autumn shooting, and a few of us in the Yukon are very fond of it.

MR. ARSENAULT: It might be well for Col. Thompson and myself to get together.

DR. MURRAY: You had better make a trio of it—yourself, Col. Thompson and Dr. Baker.

We were looking forward to the pleasure of having with us this afternoon Hon. Honoré Mercier, Minister of Colonization, Mines, and Fisheries, province of Quebec, to give us an address on the subject of *Co-operation in the Regulation of the Fur Trade.* Few Cabinet ministers have taken a greater personal interest in the work of their departments than Mr. Mercier, to whose personal efforts the encouraging progress that has been made in the province of Quebec in wild life conservation is due. As Quebec has adopted special measures to conserve and regulate the fur resources of the province, it is peculiarly fitting that the discussion on this subject should be opened by Mr. Mercier. In the regrettable absence, however, of Hon. Mr. Mercier, we are to have the pleasure of a paper on the same subject by Mr. Bellisle, Inspector General of Fisheries and Game for the province of Quebec.

Co-operation in the Regulation of the Fur Trade

BY

J. A. Bellisle

Inspector General of Fisheries and Game for the Province of Quebec

THE province of Quebec possesses two great means of seconding the efforts of the Commission of Conservation—the creation of a number of fish and game reserves and the control of shipments of game and furs. Nearly 25 years ago, the Department of Crown Lands created certain hunting reserves, which were leased both to individuals and to fish and game clubs incorporated in our province. The object, and the aims for which these clubs were incorporated are, as provided for by law, to aid in the enforcement of the laws and regulations concerning the protection of fish and game in this province. These clubs may acquire and possess both movables and immovables necessary for their enjoyment of the privileges and the performances of the duties entrusted to them. They lease, for sporting purposes alone, certain fish and game reserves, which have been set apart for that purpose, by the Lieutenant Governor in Council, and the first condition of such leases is an efficient surveillance of the territory at the expense of the lessee. Any neglect of this essential condition of the lease, or any utilization of the reserve for other purposes, involves the cancellation of the lease, as well as prosecution of the lessee at the hands of the Department.

Fishing and Hunting Leases

Outside of the clubs, a certain number of individual sportsmen are lessees of fishing and hunting territories; these are bound by the same obligations as clubs, in regard to the protection of their reserves and to the limitations within which they may utilize the privileges granted them by their lease. The number of reserves thus leased to clubs or individuals is 425, and they include an approximate area of 8,000 square miles for hunting purposes. In addition to the 469 rivers, or portions of rivers, which are under lease for fishing purposes, 1,444 lakes are also leased, but I must add that several clubs lease all the fishing rights within the limits of their hunting territory; and, a large portion of these being unsurveyed, it is impossible to state precisely

the number of lakes which we actually have under lease. However, it may be affirmed, without any fear of exaggeration, that the number of our leased lakes is at least 2,500. All these reserves are, in effect, special parks, where the protection is most efficient and in which game may freely multiply. Moreover, all these lessees are required to employ one or more guardians named by the Minister, and to pay them during the twelve months of the year. Many of them, in order to fully comply with their obligations, employ additional guardians during certain months of the year. For instance, during the two or three months of the winter, in which the great depth of the snow most favours poaching operations, the clubs usually furnish additional help to their guardians. The same remark applies to lessees of fishing reserves during the summer and autumn months, and especially in the spawning season. Some of the lessees of salmon rivers employ as many as eight or ten guardians during the months of September and October. If we add the number of special guardians of clubs to the fish and game wardens employed by the department, we have a total of 600 officers scattered throughout the province. When it is considered that the reserves are chiefly in the most accessible sporting localities of the province, and are consequently the most exposed to poaching operations, it will be seen that this system is a very great aid to the protection of the fish and game wealth of the province.

Control of Shipment of Game

The second of our great means of protection is the control of the shipments of game. Up to two years ago, we limited ourselves to the control of big game shipments. At the commencement of 1917, the Department of Colonization, Mines and Fisheries inaugurated the control of the fur trade. A law was passed obliging fur traders to take out a license and to report monthly all furs or skins bought by them. In order to render this control more efficient, the Government imposed a royalty on each skin, which must be paid before it is stamped. From that date, no skin could be put upon the market without being stamped and the royalty paid, and no skin could be shipped outside of the province without having been first stamped and the royalty paid thereon, and this under the penalty of a fine and confiscation. The same regulations prevail for furs or skins which are shipped from one portion of the province to another, when they are sent from localities where the province has officers to mark them. The shipment of either game or skins, of any kind whatever, is prohibited, unless the contents are plainly marked on the outside of the packet, box, valise, or other receptacle containing them; and this is also under the penalty

of confiscation and a fine. This measure permits us not only to control the shipments, but also to prevent the purchase and shipment of furs taken out of season.

Less Furs Illegally Taken

One of the principal results of this policy of control of all shipments is a very great diminution in the number of furs taken illegally; for it is now useless to buy them from the trappers, seeing that they could not be disposed of; none of our officers will stamp furs which have evidently been taken out of season. The fur dealers are most anxious to second our efforts in this direction, because the purchase of furs taken out of season is a detriment to the fur trade. Furthermore, these changes in the law permit dealers to conduct the trade openly and to sell their furs like all other traders without fearing the surveillance of the government officers. They have only to buy their license, have their furs stamped, pay the royalty, and their trade is as free as that of any other branch of commerce.

The passing of this law, in the winter of 1917, gave us control last year of the shipments of 617 dealers in furs. This year, with the perfecting of our system, we have been able to control the operations of 793 licensed dealers, who report to us each month and thus enable us to trace and to follow every skin in the trade. In the first year of the operation of this new system, the Government stamped and collected royalty on the skins of 192,241 muskrat, 38,576 beaver, 9,846 marten, 33,396 ermine, 5,964 mink, and 7,350 deer, besides a large number of other furs or skins, but forming a grand total of 317,060 skins, representing a value of $1,500,000. When we consider that this system is new, and that the result just mentioned is that of its first year in operation, we believe that we are justified in considering it most satisfactory.

All Furs and Skins Stamped

The law imposing a royalty, and the obligation to have all furs and skins coming from the province of Quebec stamped, enables us further to ascertain very approximately the different species and quantities of the furs taken, particularly in certain portions of the province. Thus, the Lake St. John region has furnished considerable quantities, also the Saguenay, more generally known as the North Shore. When the system has been longer in operation we shall be in a position to say what species are most sought after; whether there are abuses in certain localities; whether it is necessary to regulate the taking of any species, because of its growing scarcity; to ascertain whether it is necessary to modify our hunting seasons, or to prohibit completely the hunting of some particular species of fur-bearing animals, in order to permit their

greater increase. I do not pretend, however, that we have succeeded in preventing all poaching; ill-disposed shippers are still able to send packages through the mails, or may succeed in evading the vigilance of our officers in certain localities near our boundaries and ship furs outside of the province in a surreptitious manner.

Assistance of Neighbouring Provinces

Once on the other side of our frontier, we are at the mercy of neighbouring provinces and states, and, as none of our neighbours has a similar law to ours, the control of these shipments is difficult. In this connection, however, I am able to testify to the good will towards us, of which the authorities of the neighbouring provinces, and especially those of Ontario and New Brunswick, have given proof. For some months past, whenever authorities of our sister provinces have ascertained that furs shipped from Quebec did not bear the stamp required by our laws, they have seized them and returned them to us. We also benefit in the same way at the hands of certain officers of the state of New York. I am glad to say also that the postal authorities have given us their assistance in a certain measure to enable us to control the sending of furs by parcel post. This improved system only operates, however, in the cities of Quebec and Montreal, but I anticipate with pleasure the possibility of such control being extended, not only to the large centres, but also to the country post offices. The postal authorities have shown themselves disposed to second our efforts, and I have no doubt that, before long, there will be complete control of the shipments of furs through the mails.

We have not yet discussed the question with the Department of Customs. This department, through its officers along the frontier between Quebec and the United States, is in a position to know everything which crosses the border. I have no doubt that, when we have obtained from the customs authorities the assurance that no furs shall be shipped from Quebec to the United States, without being properly stamped, the different dealers who, at present, fail to observe the law, will abandon their clandestine trade.

Uniform Laws to Control Furs

I have already said that a certain number still succeed in evading the law in shipping their furs to the other side of the interprovincial boundary. These furs are then reshipped to the large fur houses of Montreal or Quebec, as if they originated in New Brunswick, Ontario or Manitoba, and, with the exception of beaver and otter, the sale of which is controlled in Ontario by the Government, it is impossible for us to verify the point of shipment of these skins. The Government of Ontario, in order to avoid abuses, very properly compels merchants who receive beaver

or otter skins with the Government tag, to return these tags immediately to the proper department; thus, we are unable to establish in a satisfactory manner whether or not these beaver or otter skins really come from Ontario. This inconvenience will be overcome when the other provinces adopt a fur marking system identical with ours. Such action will also control the shipments of skins taken within the limits of their respective provinces. I do not despair of seeing this system of control universally adopted some day, and, when this is done, we shall have an almost perfect protection of the wild life, which is, after our forests, one of the our greatest sources of revenue.

With this object in view, and for the securing of greater co-operation in the regulation of the fur trade, I beg to move the following resolution:

Co-operation in the Regulation of the Fur Trade

That, in view of the increased impetus given to trapping operations by the high price of furs, and by more active competition in the trade, there is now much greater danger than hitherto of a very serious decrease in the supply of some of our most valuable fur-bearers, and even, in some cases, of their entire disappearance.

That experience proves that valuable statistics of much of the wild life of the country, so desirable for ensuring by timely action the perpetuation of declining species, may be best secured by a departmental control of the trade in raw furs.

That this desirable control, instead of being a burden upon the public, may be made a source of income by the imposition of a small royalty upon raw skins; and that nothing is more reasonable than that such small royalty should be contributed to the state from the vast fur industry, based mainly upon the wild life of the public domain.

That one of the chief difficulties encountered in controlling the trade in raw pelts, the royalties paid thereon, and the statistics thereof—as in the enforcement of all regulations for the protection of wild life—is to be found in the efforts to evade the law by the lawlessly inclined, who take advantage of the differing provisions of law in contiguous provinces and states, to ship the products of the chase through territory imposing less rigorous conditions than those of the province or state whence they originally come. Therefore, be it

Resolved: That, while fully recognizing the complete control belonging to each province of the Dominion over the entire wild life of its own territory, it is the sense of this Convention that, so far as possible, uniformity of laws and regulations regarding such wild life, and especially with reference to the control of the trade in raw furs, is extremely desirable, as well as the utmost measure of reciprocity in the enforcement thereof; and, further, that, even in the absence of

a complete uniformity of such laws and regulations, most desirable results have been proven possible by a neighbourly reciprocity in enforcing them, as illustrated in the reciprocal return to their place of origin of raw furs and game, which, when seized for illegal killing or shipment, are declared to have been shipped from another province.

Definition of Unprime Skin

MR. HARKIN: Has the province of Quebec, in connection with its fur trade, adopted a clear-cut definition of 'unprime' skin? In connection with our Northwest Game Act that question of unprime skins has arisen, and we have been told that it arose also in connection with the administration of the new law in Quebec. People interested in the fur trade have represented to me that, at times, there is the utmost difficulty in deciding whether a skin in unprime or not, unprime being such a wide term; the classification being usually based on the colour of the hide. That is represented as not a safe basis to go on, and it occurred to me that, at a meeting like this, we might get suggestions as to a clear-cut definition of unprime skin. From what fur dealers have told me, it would be of very great advantage to them, and I think also that it would be of great advantage to those who are administering the law.

MR. BELLISLE: It is very hard to give an exact definition of prime or unprime. Our law provides that fur-bearing animals shall not be killed before November 1st, and all furs taken before that date are considered unprime. Of course, some furs taken after the first of November, at first sight, look like unprime skins, but if the owner can prove that the skin comes from an animal killed after November 1st, even if it does not look like a prime one, we will consider it as a prime one. It is a question of dates; we cannot give an exact definition.

MR. E. MELLON: You could not expect the hunter to know whether or not a skin is prime before he skins the animal; he cannot tell simply from the outside appearance. Naturally, 'unprime' must apply to skins taken from animals killed in the close season. If a fur-bearing animal is caught after the opening of the season, then it is caught legally, though it may not be prime, especially in an open season like this year. You cannot define what is unprime skin and what is prime skin.

Troubles of Fur Dealers

MR. HARKIN: From what some fur dealers have said to me, I was inclined to think that they would prefer that a concrete definition be given of what constitutes an unprime skin, so that a dealer need not buy a skin that had an appearance of unprimeness. The difficulty is that he buys the skin

believing that it was killed in the proper season; after it is shipped he is liable to have difficulty with the various officers because, in their opinion, judging from the appearance of the skin, it is not prime. It seems to me that we might get better results if we had an exact definition. If the colour of the skin indicates unprimeness, why not say so, that there may be no room for doubt.

MR. MELLON: That is the point; you cannot do so. In Quebec, the fur traffic is legal after November 1st. There has been very little trouble with the fur dealers in that province. Any fur taken after the opening of the season we are at liberty to buy and to have in possession, so long as we are certain that it has been taken in the open season. Suppose we take muskrat skins after November 1st, which are not prime, though they might be fit for dressing and manufacturing purposes; are we to destroy all these skins? We must leave ' unprime ' to mean skins taken in the close season.

DR. HEWITT: I think that what Mr. Harkin is aiming at is this: Could not we, as a conference, agree on the distinction, so that everybody could follow the same idea? If ' prime ' is to mean skins taken in the open season, then let us have that definition, and everybody will take it as a definition, fur companies as well as game officers.

MR. MELLON: My point is that you cannot make a definition applying to the skin itself. You cannot define a prime skin.

MR. BELLISLE: We have to depend on the dates; that is the only way.

MR. JAMES WHITE: Why not define an 'unprime' skin as one taken during the close season?

MR. KNIGHT: In our Nova Scotia law we do not use the word ' unprime,' because it is so hard to define. We make it illegal for anyone to have in his possession skins of animals that are taken out of season.

DR. MURRAY: If there is some agreement with regard to that, we will pass on to the consideration of the resolution proposed by Mr. Bellisle.

MR. RAPSEY: I beg to second the resolution. The suggestions which it contains are in keeping with present-day conditions.

DR. HEWITT: The sense of the resolution, as I understand it, is this: It emphasizes the desirabilty of uniformity in laws and the desirability of uniformity in regard to the control of the trade in furs—that is, the regulating of the fur trade—and that the regulations of the different provinces should be as nearly the same as possible. The address which Mr. Bellisle gave this afternoon is an exposition of a most successful experiment in the regulation of the fur trade,



GRAIN-FED THREE-YEAR-OLD BUFFALO, AT BUFFALO PARK, WAINWRIGHT ,ALTA.

Photo, Courtesy Dominion Parks Branch



BULL MOOSE, BUFFALO PARK, WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch

which could well form the basis of action to secure uniformity of laws in the different provinces. It is that reciprocity or co-operation among the different provinces that this resolution wishes to bring about.

MR. HOSE: How many provinces have provision for fur traders' licenses or the payment of royalties?

DR. HEWITT: I could not tell you.

MR. HOSE: The Game Conservation Board of British Columbia has recommended a fur-trader's license.

DR. HEWITT: The Northwest Game Act requires a license, too.

MR. ARSENAULT: It may be difficult at times to distinguish between the furs of wild and of domesticated animals. How is that managed in Quebec in connection with the skins of domesticated foxes, or foxes kept in captivity?

MR. BELLISLE: We do not impose a royalty, unless it is proved that the fox is bought and put in a ranch for ultimate sale. As a matter of fact, it is only on foxes raised in the ranch that we do not impose royalties.

MR. ARSENAULT: You must have some difficulty at times.

MR. BELLISLE: It does not work out too badly. As a general rule we stamp the furs, but we do not exact any royalty.

DR. BAKER: What is your royalty and how do you collect it?

MR. BELLISLE: On black fox we exact $15 on each skin; on silver fox, $10; on cross fox, $1.50; on beaver, 35 cents; on otter, 75 cents; on red fox, 60 cents; on muskrat, 2 cents; on ermine, 2 cents. It varies, according to the value.

DR. BAKER: You do not pay a bounty on muskrats in this part of the country?

MR. BELLISLE: Oh, no; quite the contrary.

DR. BAKER: We pay a bounty on them.

MR. BELLISLE: We have collected quite an amount of money on skins during the last year.

The resolution was agreed to.

The Use of Pump and Automatic Shotguns

Dr. A. R. Baker: Mr. Chairman: I wish to move the following resolution:

Be it resolved, that the Provincial Legislatures of the provinces of Canada be urged to amend their game laws with respect to the use of the pump and automatic shotguns, and that some such provision be made as provided for by Section 15 of the Game Act of British Columbia, which reads as follows:—

> " It shall be unlawful for any person to use or have in his possession a pump or repeating shotgun of any kind with a magazine capable of holding more than one cartridge, or an automatic shotgun of any kind. Any such automatic, pump or repeating shotgun unlawfully found in the possession of any person may be seized by any Game Warden or constable, and the same may be disposed of as in this Act provided."

Automatic Gun Destructive to Game

I am a firm believer in the elimination of the automatic gun from Canada. The automatic shotgun is one of the great menaces to our bird life; more harm has been done by it than by almost any other weapon that we have. Some of the best authorities claim that the pump gun is worse than the automatic gun, but the only good that I can see resulting from the manufacture and use of either is the benefit that results to the manufacturers of the guns and to the manufacturers of ammunition. As a member of a Conservation Board, and as one who believes in the conservation of our game, I do not believe in catering to the financial needs of ammunition concerns or of gun manufacturers. The pump gun and the automatic shotgun have done more to cripple and to hurt our migratory birds than any other arms that we have in use throughout the country. I was glad to learn last night, at the lecture given by Dr. Hornaday, that the states of New Jersey and Pennsylvania had passed legislation prohibiting the use of the automatic gun. I am proud to say that British Columbia has also taken action in this matter, and has not only made it unlawful for any resident of the province to have an automatic gun in his possession, but has also gone so far as to say that a pump gun shall not contain more than one cartridge in its magazine, making it equal to a double-barrelled shot-gun. The enactment of that law has done a great deal for the conservation of our game in British Columbia; it has prevented the

crippling of a large number of our birds. I should like to see the rest of the provinces bring into force the same kind of law.

MR. BELLISLE: For the information of this conference I may say that there is a clause in the Quebec game laws prohibiting the use of the automatic gun. That clause has been in our Act for ten or fifteen years.

DR. BAKER: How about the pump guns?

MR. BELLISLE: We do not prohibit them.

Pump Gun Prohibited in P. E. Island

MR. ARSENAULT: We have had on our statute books for over ten years a similar law to that of British Columbia, prohibiting the use of the pump or automatic gun. But it is very annoying to our sportsmen, when they see the pictures in the magazines of the large bags of game secured elsewhere by such means, while they themselves are entirely excluded from such shooting; and, to a certain extent, we can sympathise with them. One of the things that tends to cause dissatisfaction is the way the game is slaughtered in other places, as compared with the few hundred birds that are taken in the districts farther north. The use of pump and automatic guns is permitted in other places, to the great destruction of game and bird life, and it is a matter of complaint on the part of some that, considering the few hundred birds that would be secured in our province, the people should be prohibited from shooting.

DR. MURRAY: Certainly this seems to be a matter in which uniformity of legislation in the different provinces would be desirable.

MR. LAWTON: When they were simply territories, Alberta and Saskatchewan enacted legislation, in 1902, I think, prohibiting the use of the automatic shotgun. I believe the pump gun is the more deadly of the two. I have much pleasure in seconding the motion.

MR. LLOYD: I would suggest that the resolution be amended to include the automatic rifle.

Effect of Automatic Rifle

MR. HARRIS: I had hoped that the motion would include the automatic rifle, but I do not desire to suggest it as an amendment if it would prevent the passage of this resolution. There is no question about the automatic rifle being unsportsmanlike. Only two years ago, I saw a number of deer, most of which had been shot with the automatic rifle. A small doe had three bullets in it; I would say that not ten pounds of meat in that doe was fit to eat. That is a shame. I remember that a buck had five shots within the space of my two hands; it was simply torn to pieces. Of course, they were explosive bullets. That was unsportsmanlike, and was not economical; they would not get enough

out of it, after paying their expenses, to make it worth while carrying the animals from the bush to the camp. There would certainly be much more opposition to the prohibition of the automatic rifle than there would be to the prohibition of the automatic and pump gun; but certainly the automatic rifle is an arm that should not be carried by sportsmen.

DR. BAKER: I think that my friend Mr. Harris is straying from the point. This Conference is being held, of course, for the good of all game of the country, but more especially the migratory birds. To eliminate the use of the automatic rifle in a big game country would cause hardship. I know that from personal experience. I have hunted the grizzly bear for a number of years, and I would hate to go out in the grizzly bear country without an automatic rifle.

MR. HARRIS: That is all right, but the grizzly bear is a predatory animal; I do not think he is what we call big game—I mean, deer, and that kind of thing. If you want to go out for lions, tigers and elephants, like Theodore Roosevelt did, take your automatic rifle.

DR. BAKER: First, last and always, I am in favour of game conservation, and, if excluding the automatic rifle would help conservation, I would be in favour of it. But I cannot see that the automatic rifle does very much harm in northern Manitoba and Saskatchewan, in Alberta or in British Columbia. In our province—and I believe the same applies in Alberta, Saskatchewan and Manitoba; if not, my friends will correct me—we have very small bag limits for the big game, and I believe that the automatic rifle does not do any particular harm in these districts. It is immaterial whether the hunter gets the bag limit with an automatic rifle or with a trench mortar. The great harm that is done with the automatic guns and the pump guns is to the migratory birds, not to big game, so that I would not be in favour of amending the resolution to include the automatic rifle.

Automatic Rifle saved Theodore Roosevelt

MR. CHAMBERS: If the suggestion which has recently been made with regard to the automatic rifle had been in force two or three years ago in the province of Quebec we might have had to deplore at that time something which we have all been deploring during the last few months, the death of Theodore Roosevelt, but at the hands of an infuriated moose instead of by natural means If he had not had an automatic rifle in his hand he would certainly have been gored to death by that moose. We have the evidence in our department that he was obliged to shoot a moose that charged him several times immediately after he had killed one.

MR. HARRIS: There are only a few here who go after grizzlies; personally, I take the Scotch method, and leave the grizzly alone. I am anxious that what is done here shall be done harmoniously and unanimously so that when we go away we shall be enthusiastic missionaries, and something will be achieved.

The resolution was agreed to.

DR. MURRAY: Mr. R. H. Coats, Dominion Statistician and Chief of the Dominion Bureau of Statistics, has been invited to address the conference on the important subject of 'Fur Statistics.' The success that has been obtained in working out plans for the collection of agricultural and other statistics leads us to believe that Mr. Coats will be able to indicate methods whereby statistics of this important resource may be secured.

Fur Statistics

BY

R. H. Coats

Dominion Statistician and Chief of the Dominion Bureau of Statistics

I AM grateful for this opportunity of saying a few words to your Conference on the subject of Statistics, because I hope you may be able to help us in a difficulty that confronts us at the Bureau of Statistics. The difficulty is in connection with fur statistics. We have organized, during the last eighteen months, a census of production for Canada, which we call the Census of Industries. It is to be on an annual basis, and is to be as comprehensive as we can make it, including agriculture, fisheries, forestry, mining, and the various branches of manufacture. It has been a rather large undertaking to organize, because we hoped to work in close co-operation with the various governments, Dominion and Provincial, which have regulative functions in different sections of the field. For example, in dairy statistics, until the last two or three years, we had no less than eleven departments collecting statistics, the Bureau of Statistics, the Dominion Dairy Branch, and the nine provincial dairy branches. We could not collate the statistics of the several branches, because they were all compiled by different methods and covered different aspects. Today, we are doing this work as follows: First, we have united upon a form. The Bureau of Statistics prints it; a sufficient number are then sent to each provincial department, which collects the data through its field officers, who are, of course, excellently qualified for that function. The resulting schedules are sent to my office for compilation, for we have about $100,000 worth of machinery and a large compiling staff, which can handle such work expeditiously. We immediately send back the result to the provinces for use in any way they may wish. We publish a report for the whole of Canada; it is edited by the Dairy Branch, though finally sent out by the Bureau.

In that way we think we have the maximum efficiency that can be obtained in dairy statistics, because we unite the statistical effici-

ency that ought to be ours with the technical knowledge of the several departments. I merely mention that as an illustration; we have eight or ten such working arrangements with twenty-five or thirty Dominion and Provincial departments.

Planning to Secure Fur Statistics

The section devoted to fur statistics is one that we have hoped to cover in similar fashion. We consider it a very important section, because it represents the economic return we get from perhaps half of the area of Canada. We have not, however, made final arrangements in the matter, though we have made arrangements of a sort. But we have drawn up our plans, and I will read the memorandum that was prepared in my office over a year ago; perhaps that is the most expeditious way in which the practical problem can be placed before you.

MEMORANDUM ON STATISTICS OF THE PRODUCTION OF RAW FURS IN CANADA

Raw furs are the chief commercial product of the wild life of Canada, and as such represent the only economic return from hundreds of thousands of square miles, constituting perhaps half the area of the Dominion.

The existing Canadian statistics of raw furs are in five areas namely, (1) those of the decennial census; (2) those shown in certain sections of the annual industrial census; (3) those of the Indian Department; (4) exports and imports; (5) those of certain provincial departments.

(*1*) *The Decennial Census*—This return shows the number and value of the different kinds of furs taken in the several provinces during the year preceding the census. The statistics are obtained as follows: In the settled districts, a return is obtained by the census enumerator from every farmer, showing the number, kind and value of forest animals taken on the farm. For the unorganized districts, a return is obtained from the several fur-trading companies, showing the number, kind and value of raw furs (also fish) purchased from individual Indians; at the same time, the number and kinds of furs captured by individual Indians living on reserves are obtained through the Indian Department, these being checked against the fur-traders' returns to prevent duplication. The total capture in 1910 showed a value of approximately $2,000,000, divided among 41 kinds of furs, and representing about 1,200,000 animals.. The rise in prices would perhaps double the above values today.

The most obvious defect of this inquiry is its infrequency, which renders the results of secondary value as a commercial guide, and also limits their usefulness in the study of problems connected with the increase or decrease of wild life.

(*2*) *The Industrial Census*—Two of the 450 sections of the annual industrial census throw light on the output of raw furs, namely, (*a*) the sections on fur-dressing establishments, and (*b*) establishments for the manufacture of hats, caps and fur goods. Each establishment is required to answer upward of 100 questions on various details. One of these groups of questions is ' Materials used '; a second is ' Products '. The chief raw material of fur-dressing establishments is raw furs and the product is dressed furs. Similarly, for hat, cap and fur manufacturing establishments, the items ' Furs and skins, raw,' and ' Furs and skins, dressed,' occur under the heading ' Material used,' whilst under the general heading of ' Products,' men's fur and fur-lined coats, ladies' fur and fur-lined coats, fur caps, fur hats, muffs, stoles and other neckwear, fur or fur-lined gloves or gauntlets, are included. There is also an item requiring a return of receipts for custom work on the remodelling and the repairing of furs.

The statistics for 1917 show that an insignificant quantity of raw furs was consumed in the 12 establishments engaged in the dyeing and dressing of furs in Canada, most of these concerns doing custom work only, though the dressed product was valued at over $1,000,000. In hat, cap and fur establishments (numbering 253) $2,596,332 worth of raw furs and $2,482,027 worth of dressed furs were used, the product of fur goods being valued at $9,767,872.

The above record of furs consumed in manufactures, of course, does not show the different kinds of furs or the number of fur-skins. As it includes, also, a considerable quantity of imported furs, it throws little or no light in itself on the total value of the native raw fur product from year to year.

(*3*) *Indian Department Statistics*—The Indian Department maintains a record of the amounts earned by Indians on reserves in hunting and trapping. In 1917, this was over $900,000. This, however, does not include the product of the ' Treaty No. 8 ' Indians nor Yukon Indians. It is thought, in fact, that it represents only about 20 or 25 per cent of the product of all Indians.

(*4*) *Exports and Imports*—The Canadian import classification shows the following items under the heading of furs, for the calendar year 1917:

1. Astrakhan or Russian hare skins and China goat skins, plates, rugs, wholly or partially dressed but not dyed.....	$118,666
2. Fur skins, undressed, the produce of marine animals.....	2,928
3. Fur tails in the raw state.....	144
4. Fur skins of all kinds, not dressed in any manner.....	2,810,171
5. Fur skins wholly or partially dressed..	638,858
6. Hats, caps, muffs, tippets, capes, coats and cloaks of fur and other manufactures of fur.....	475,479
The export classification has four items:	
1. Furs dressed.....	$97,627
2. Furs undressed.....	6,721,141
3. Furs or skins, the produce of fish or marine animals.....	46,353
4. Fur, manufactures of.....	33,635

No quantities are recorded of either imports or exports, and, as will have been seen, only limited distinction is made between the different kinds of furs.

Ordinarily, if one knows the imports and exports of an article and also the consumption in manufactures, one can deduce domestic production by adding exports and consumption and subtracting imports. In 1917, if one adds the exports and home consumption of raw furs, and deducts imports, one obtains a result of $6,500,000, about, as the value of the production of raw furs in Canada. There are elements of vagueness in this that render it an unsatisfactory statistic; as a reflection of the product of wild life it would require discounting by the value of the product of our fur farms, which, in some years, runs between $2,000,000 and $3,000,000. This would bring it somewhere in the neighbourhood of the 1911 Census returns reckoned at present prices.

(*5*) *Provincial Statistics*—Certain of the provinces publish statistics, but methods differ and it is impossible to collate a Dominion total. Those of Nova Scotia and Quebec seem to be the best as specific statements of furs taken from year to year.

The Remedy

The remedy lies in instituting a direct annual record of fur skins taken. This could probably be best achieved by Dominion

and Provincial co-operation, according to some such plan as the following:

It is understood that raw furs are dealt in under license of the Provincial authorities. If the Provincial authorities would supply annually to the Dominion Bureau of Statistics a list of the names and addresses of those to whom licenses have been issued for the purchase of raw furs within their respective provinces, the Bureau would undertake to circularize each licensee and obtain from him full details of furs purchased. The large trading companies, who operate outside of provincial boundaries, would, of course, be included, such as the Hudson's Bay Company; Revillon Frères; the Northern Trading Company, Edmonton; the Bryan Company, Edmonton; W. Gordon, Fort McMurray; and Colin Fraser, Fort Chipewyan. Confirmatory information might be obtained from the Boards of Trade at Edmonton and Vancouver. The Indian Department figures could be collated, and so also could the figures derived from the enforcement of royalties by Provincial departments. The operations of fur farms could be obtained as a separate inquiry, necessary if we are to thoroughly distinguish the products of our wild life.

This would not enable an exact return by provinces to be given, as there may be instances of skins being purchased by dealers from individuals in another province, but it would be approximately correct, provided care were taken to eliminate resales and all other trading between dealers. The export and import figures and the statistics of the consumption of raw furs in fur-dressing and fur-manufacturing establishments would be useful as a check.

Suggestions Requested

I hesitate to lay this memorandum upon the table, because it does not represent our final thought in the matter. But I should like to have the opinion of the Conference on the general idea, together with any concrete suggestions, expecially from our provincial confreres. I need not say that it is the supreme wish of the Bureau of Statistics to be of service in this matter, and that we should be only too happy to take any action, either independently or in collaboration with provincial departments, that you think would be advantageous. I am inclined to think that the solution of the matter lies in the rest of the provinces coming up to the standard that Mr. Bellisle has laid down.

Mr. Chambers: I move:

That this National Conference of officials, representatives of fur companies, and others interested in the conservation of our fur-bearing animals, is of the opinion that there is a very serious need of an adequate and reliable system for the collection of statistics of

the fur resources of Canada and the annual production of furs; and that, as accurate statistics are essential to the proper consideration of measures for the conservation of our fur resources, the Dominion Statistician be requested to prepare and submit, for consideration by the different governments, a scheme for the collection of fur statistics, by the co-operation of Dominion and Provincial officers, adopting a similar policy to that now established with respect to agricultural and other statistics; and that the adoption of a uniform scheme by the governments concerned be respectfully urged.

MR. KNIGHT: I wish to second that motion. Mr. Coats referred to the Nova Scotia returns as among the best, but I fear they are far from complete. The difficulty referred to by Mr. Bellisle seems to be that of inability to get an opportunity to count the skins before they leave the country. That is a matter in which the co-operation of the Dominion government might be very helpful.

Furs sent by Mail

Mr. Bellisle referred to skins being sent out by mail. We all know that the railways and the express companies issue instructions to their agents setting forth the provisions of the different provincial laws with regard to the shipment and exportation of furs, and these are very helpful in preventing the furs being sent out unless checked by the game officials. But we do not know whether it is only a few zealous express and railway agents who stop these packages before they go out; we do not know whether the carrying out of the instructions is general or not. In Nova Scotia some packages have been stopped by the railway agents, and we have learned of the shipments only through their being stopped because they were not accompanied by the required permit. We might urge the railway companies to require their agents to be very strict in that regard; but there is another means of exporting furs without checking, and that is, through the mail. The Post Office Department must, at one time, have issued instructions to postmasters informing them of the provincial regulations, because I know of several cases in which parcels were stopped by the postmasters, and the parties who were sending them out came to us for permits. But there are a great many postmasters in the province and a great leakage takes place in that way. No efforts we may make to obtain statistics will be completely effective unless that leakage can be stopped. The Dominion Government could assist us very much by issuing instructions to postmasters not to accept parcels of skins for mailing unless the senders have complied with provincial regulations.

Co-operation of Post Office

DR. HEWITT: The matter of shipping furs through the mails was discussed by Hon. Mr. Mercier and myself some time ago, when we were discussing the

question of the regulation of the fur trade. I said to him then—I repeat the suggestion now, feeling that the regulations of the various Provincial governments can be strengthened by securing the co-operation of the Post Office Department—that our Advisory Board will be very glad to take this matter up for you. The Advisory Board desires to serve as an intermediary between the various provincial departments of game and fisheries and any of the government departments here. We have taken up a number of matters of that kind, and, if we could receive from the various Provincial governments a request that on their behalf, we discuss with the Post Office Department the question of prohibiting the shipment of furs through the mails, we would be very glad. I merely suggest this as a method in which this matter could be dealt with, I think, successfully.

MR. RAPSEY: I think you will find a provision already in the postal regulations covering that point.

Licenses should be General

MR. HOSE: I am glad to hear that resolution. Since the introduction of the resident firearms license in British Columbia, which covers trappers' licenses, we have had returns from the trappers of the fur taken, the license providing that they shall, within two months after the date of expiration, return same, duly filled in, showing what fur they trapped. That is inventorying the fur-bearing animals. Our difficulty in obtaining statistics is that Indians are not required to take out a license, and they therefore, do not make any returns respecting their catch. But if we could enforce the licensing of the fur-trader, both resident and non-resident—as has been suggested by the Game Conservation Board—and he had to report the number of furs purchased and exported, we should be able to arrive at a closer estimate of the fur obtained in British Columbia. At present, we have a great many itinerant and non-resident dealers. The Deputy Inspector of Provincial Police at Prince George, says:

"I would again point out the value of fur, with its high trading profits, which induces many men to embark in the business. No revenue accrues to the Government, and established buyers are faced with unfair competition from transients. No opposition need be anticipated to a fur-buyer's license if introduced. In fact, the better class dealers feel that such an impost would offer some protection against the swarms of amateurs now travelling the country."

That is the position at present in British Columbia.

The resolution was agreed to.

The Need and Value of Local Organizations

BY

S. Harris

Essex County Wild Life Conservation Association

I WILL endeavour to extend the remarks which I had intended to make to include the necessity and desirability of local organizations.

I believe that the best results for conservation will come through local organizations. As we heard Jack Miner say this morning, the only way he had of obtaining results was through the boys—local organizations—right around his own place. Therefore, while this is about the end of the conference, you have probably kept the best for the last.

Administration of Game Laws

The Essex County Wild Life Conservation Association has been very active; therefore their findings should, I think, receive careful attention. I hope to be able to report that its findings were endorsed *in toto* by this convention, because they come from experience. But, before reading this paper, I desire to say a few words respecting conditions as I have found them in Ontario with regard to the administration of the game law.

A lot has been said about the birds. But I want to say a little about the deer, particularly as we have here to-day a representative of the Ontario Government—a man who has shown during this conference that he is careful, cautious and conscientious. I hope that he will note carefully what is said, and that he will place before his Department in such a way that they will give it careful consideration, the statements which have been made at this conference. As a matter of fact, the Ontario Government is foremost among the Provincial governments in the matter of sanctuaries.

Indiscriminate Issue of Books of Licenses

For instance, take the fees. I contend that the fees are low, and that the method of collecting them is bad—so much so that they lose at least fifty per cent. Last year the fee was $3 for taking two deer. I hope that will not occur again, so far as the taking of two deer is concerned. They issue indiscriminately books of licenses, which get into the hands

of various parties, so that a hunt club may go out to hunt with one member in possession of one of these books, and, if they are successful in obtaining game, they attach a license or tag to it and pay for it on their return, but, if they are unsuccessful, they return the book. I have long suspected that. I have taken little parties out—as a rule about six. We always paid our fee before we got on the train, so that the Government were sure of their $12 or $18 or whatever it was. That is good business.

Loss of Revenue

Last year, I decided to ascertain the facts. When I purchased my railway tickets the man said, "Do you want a book of licenses?" I said that I did and received the book of licenses. On account of the depredation in the district where we went we got only two deer, so we tagged on one set of licenses and paid $3 to the Government instead of $18. I broke the law, so I am liable to prosecution, but I do not mind paying the difference or a little more to have the thing threshed out. That practice I consider bad.

I have found in the north that there is a class of people who seem to have adopted the joint policies of the Bolshevik and the Sinn Feiner. They say, "Take all there is"—that is the policy of the Bolshevik; and "For ourselves alone"—that is the policy of the Sinn Feiner. So that the destruction which has been spoken of goes on, and is going on, in Ontario to-day.

I would like to see the running of dogs prohibited in Ontario, I also desire the checking of the pot hunter, who, for a few dollars, will kill anything and send it in to the butcher. I would also suggest to the representative of Ontario the idea of protecting the partridge for another two years.

Depredations by Wolves

Furthermore, I do hope that something will be done with reference to the wolves. If I am correctly informed, a trapper in our province has the right in the winter time to take wolves, bear and foxes, but he has no right to carry a rifle or to poison. If you can tell me how he can take the wolves without using a rifle or without poisoning them, I would like to know it.

Now, I come to the recommendations of the Essex County Wild Life Association, and from them, I shall try to show why more organizations of this kind should be brought into existence throughout Canada. I have brought with me a few copies of the Report of our Third Annual Meeting, and any one who is interested may have a copy.

Migratory Birds Convention—We believe the purpose of a Migratory Birds Convention fully representative of Canada and

United States interests would establish adequate international laws governing and regulating the killing and utilization of migratory wild fowl and insectivorous birds, and big game.

Regulation of the Fur Trade—We believe the regulation of the fur trade can best be served by provincial and national control, development and marketing, and through the sanctuary plan.

Indians and Natives—We believe there prevails a warm sympathy for the Indians but feel that legislation in their interests should be controlled and regulated.

For the purpose of establishing concrete evidence upon which to base convictions for violations of the game laws by natives at all periods of the year, we recommend periodical employment in lumbering industries, of members of the government secret service with a view to ultimate prosecution of offences against, and stricter enforcement of, existing game laws. The collection or compilation, at the present time, of evidence of past infractions of game laws by natives, and negligence of duty by game wardens, through interviews with sportsmen who have domiciles erected on provincial and national forest lands would be based, influenced or restricted by fear of destruction by fire of their respective properties by natives of the district in which they are domiciled.

Game Sanctuaries—(1) For the purpose of greater privacy for breeding and rearing of insectivorous and game birds and valuable game animals we recommend the establishment on provincial and national forest lands of numerous 5,000 to 10,000-acre game sanctuaries sufficiently far apart to provide adequate open area for the purpose of hunting, shooting and killing a limited number of game birds and animals under license, during a prescribed open season, and at a favourable period each year.

(2) For the purpose of creating a chain of refuges as temporary resting places for game birds and animals and, particularly, in the interests of the caribou which is a wandering and roaming animal of importance and value, we recommend the establishment in each county of one or more game sanctuaries sufficiently far apart to provide adequate open hunting area where a limited number of game birds and animals may be hunted, and killed each year under license.

(3) For the purpose of assisting nature to perform its functions on game sanctuaries free from the menace of fear, panic or disturbance, we recommend that running of hounds or other dogs on provincial and national forest lands be prohibited at all periods of the year.

(4) For the purpose of affording game sanctuaries adequate protection from the menace of predatory birds and animals we

recommend provision for adequate payment of intelligent and reliable game wardens and permanent place of residence in each game sanctuary, and for adequate equipment, such as horse, fire-arms, traps, and other contrivances necessary to prevention of, and protection from, fires.

(5) For the purpose of protecting private lands adjoining sanctuaries from the depredations of the fur-bearing animals on the sanctuaries, we recommend the establishment by wardens of permanent trap-lines on the borders, thus preventing the overflow from game sanctuaries to private lands of valuable fur-bearing animals, and that the proceeds from the meat and skins be utilized to provide financial assistance for the establishment, development, maintenance and administration of game sanctuaries.

(6) For the purpose of adequate enforcement of game laws and protection from the menace to game sanctuaries of friendly interest and sympathy for natives domiciled in close proximity of game sanctuaries established on provincial and national forest lands, we recommend the appointment as sanctuary wardens of qualified men now non-resident of the respective districts in which game sanctuaries are established.

(7) For the purpose of defining the boundaries of game sanctuaries we recommend the erection of posts at intervals, to which would be attached a heavy gauge wire, breast high, around the entire sanctuary area. Signs notifying and warning hunters that the wire represents the boundaries of a game sanctuary, to be not violated, should be posted at intervals of 300 yards.

(8) For the purpose of recovery by hunters on open hunting areas of game birds and animals wounded on open hunting areas which have flown or run and fallen or dropped within the boundaries of game sanctuaries, the hunter should seek and notify the sanctuary warden who would locate the game bird or animal and, if wounded seriously, would despatch it and deliver it to the owner but, if not seriously wounded, the sanctuary warden should provide all necessary aid and assistance to its recovery.

Organization of Assistance to Sanctuary Wardens—We believe an encouraging word from the Commission of Conservation, through the public press of Canada, to the sportsmen of Canada would stimulate to action, and result in, the organization of County Game Protective Associations as localized protective units.

Enforcement of Game Laws Respecting Hunting and Shooting on Open Areas—For the purpose of enforcing adequate respect for



HERD OF ELK IN BUFFALO PARK, WAINWRIGHT ,ALTA.

Photo, Courtesy Dominion Parks Branch



ELK IN BUFFALO PARK, WAINWRIGHT, ALTA.

Photo, Courtesy Dominion Parks Branch

the game laws governing and regulating the hunting, shooting and killing of a limited number of game birds and animals on the prescribed open areas, we believe hunting licenses should contain the following oath clause:—

I.....having familiarized myself with the laws and regulations pertaining to hunting, shooting and killing of game birds and animals, do hereby solemnly declare that I will observe the laws and will inform as to any violations that come to my notice.

Procure game hunting licenses direct from Government—For the purpose of preventing shelter to violators of game laws by hotelkeepers or summer resort keepers, we recommend that all game hunting and fishing licenses be procured by licensee direct from the proper department of the respective governments.

I move that the report of the Essex County Wild Life Conservation Association be received and referred to the Advisory Board, and that the recommendations in which this conference is especially interested be considered as sympathetically as possible.

The motion, which was seconded by Dr. Bryce, was carried.

MR. HARRIS: I wish to move the following resolution with regard to the encouragement of local organizations:

"That this National Conference of officials, sportsmen, and others concerned in the conservation of game animals and other wild life, is of the opinion that, as one of the best means of promoting the conservation of these animals is by the promotion of local game and wild life protective associations, the organization of such associations be encouraged by every means possible and that the Provincial governments be recommended to make special efforts to promote the organization and to assist in the maintenance of such associations."

The motion was seconded by Rev. T. J. Crowley, and carried.

Committee on Indians

DR. BAKER: The Committee appointed to consider the question of destruction of wild life by Indians begs to submit the following resolutions:

"Be it resolved that, in view of the destruction of game illegally by Indians of the various western provinces, the Dominion Government be urged to co-operate in the enforcement of the game laws in this particular respect, and more especially in the provinces of Alberta, Saskatchewan, and British Columbia, by means of the Royal Northwest Mounted Police or other special officers in districts where damage to game by Indians most frequently occurs."

In moving this resolution on behalf of the Committee, I may say that, recently, the Dominion Government has established various districts in which are stationed Northwest Mounted Police. If the Commission of Conservation will recommend that these Northwest Mounted Police help us in the enforcement of our laws throughout the west, I think we can handle this Indian question very effectually.

DR. BRYCE: Any one who has known the Mounted Police, and is familiar with the great service they have rendered in the years gone by, would be glad to see that done. I have much pleasure in seconding the resolution; it is a very appropriate one.

The resolution was agreed to.

Recommendation of Grant to Mr. Miner

DR. BAKER: I have another resolution which was recommended by the Committee on Resolutions. It is as follows:

" Resolved, that this convention recommend for the consideration of the Provincial Legislature of Ontario the granting of a sum to Mr. Jack Miner for the purpose of defraying his expenses in connection with the feeding of migratory wild fowl on his bird sanctuary."

The sum, of course, to be fixed by the Legislature of Ontario.

Public Should Bear the Cost

MR. HARRIS: I have much pleasure in seconding that motion, knowing, as I do, the work that Jack Miner has done out of love for wild life. I know that he does not want any recompense, but he should not be permitted to bear the expense when the whole country is getting the benefit of what he is doing.

MR. JAMES WHITE: I do not wish in any way to oppose the passing of this motion. The only question that arises in my mind is whether, in view of the statement made to me by Hon. Mr. McDiarmid, we might not slightly modify it. Mr. McDiarmid did not give an actual promise, but he gave the next thing to it.

DR. BAKER: We all know, as game conservers and sportsmen, that Mr. Miner has done a great deal for Ontario in the preservation and conservation of the Canada goose. To my mind this conference should pass a resolution asking the Government of Ontario to recompense him for his expenditure in this connection. The only change that I would consent to without putting the matter to a vote would be that of making it a recommendation of the Commission of Conservation to the Government of Ontario that they take care of the feeding of these birds that Mr. Miner has harboured and fed for years; and that, if the Legislature of Ontario does not see fit to help Mr. Miner in this respect, the Commission of Conservation take it up with the Dominion authorities and see that he is provided for. It is without doubt a crime and a disgrace that a man who has to work hard for his living is allowed to do so much for the province without receiving any aid from the game departments of this great Dominion.

Ontario to Make Grant

MR. JAMES WHITE: I hope that nothing I have said would in any way indicate that I was not as much in favour of the resolution as Dr. Baker, or as any one

else in this room, for I acknowledge myself to be second to no one in that respect. No one in this room has a greater respect and admiration for the work that Mr. Miner has done than I have. My sole idea in making the remarks which I did—and which I regret were misunderstood—was with a view to making the recommendation stronger. I wanted to have the resolution slightly modified in its wording, so that its chance of obtaining effective action would be greater. Any one who has anything to do with Governments knows that, if you put a thing forward as an accomplished fact, your status is better than if you put it forward only as a recommendation. I do not wish to have the wording altered unless it will increase the chances of the province of Ontario taking favourable action on it. I asked Hon. Mr. McDiarmid, on behalf of the Commission of Conservation and the Advisory Board on Wild Life Protection, to put the sum of $700 in the estimates for the coming year for this purpose. I suggest that the resolution be worded so as to come from the Commission of Conservation and the National Conference on the Conservation of Game, Fur-bearing Animals and other Wild Life, held in Ottawa on February 18 and 19, 1919.

MR. MINER: Now, gentlemen, I have thirty acres; I am building it up. I have only just started. I am fixing up another pond in order to get the swans to light. These birds that I am taking care of belong to the people of America. I have made a success of raising English pheasants, and, while I am not figuring on that thirty acres so far as dollars and cents are concerned, I can raise $3,000 worth of English pheasants a year by putting in my time and can get $5 a pair for them. I have shipped a good many. Professor Olds, of the United States Department of Agriculture, told me that he had issued more permits to me for the shipment of English pheasants to the United States than any other breeder we have in Canada. If the Canadian Government does not help me—you cannot blame me—I am going to ask Uncle Sam to help me; but I don't want to.

MR. LAWTON: Does that resolution also include a recommendation to the Dominion Government?

DR. BAKER: Yes. I shall be glad to accept Mr. White's suggested addition to the resolution.

The resolution was carried as amended.

MR. MINER: I have been 30 or 40 years building up my place, and the public come there in large numbers. Now I have to make my home private or else move away from there if I expect my wife to live; it just gets on her nerves. I am going to try to lease five acres of land right across the road and fence it; then the people can

sit in their automobiles on the road and see the birds by thousands. That is my plan; but I cannot open my home and my premises there to the public the whole year. I will for a month in the year, or from 20th April to the 1st May, but I cannot do it all the time.

Jack Miner Popular

DR. HEWITT: An explanation is due to Mr. Miner, and evidently to some members of the conference, in regard to our place of meeting this morning and the congestion at that meeting. Our idea in having Mr. Miner here to address the conference was to show the representatives of the other provinces and the sportsmen what Mr. Miner was doing. It was not intended that that meeting should be open to the public, but Mr. Miner's reputation is such that he cannot go from one place to another without people knowing it, and evidently some of his friends heard that he was coming here and they filled more than half of the hall. The idea was to invite Mr. Miner here to tell us what he was doing, with the object of passing such a resolution as Dr. Baker has moved, in order that we might get strong action on the part of all the organizations in support of this movement.

National Organization for the Conservation and Protection of Wild Life

DR. HEWITT: I have been asked to bring up a matter which has no doubt occurred to all who have attended this conference, and that is, whether it is desirable to have in Canada an organization of game officials, conservationists and sportsmen—in fact, of all who are interested in the protection of wild life. A number of the members of this conference have intimated that they would like to see such an organization formed; therefore, before we close our proceedings, it may be desirable to discuss this matter, and, if necessary, pass a resolution covering it.

Value of Permanent Organization

The idea certainly appeals to those of us in Ottawa who are concerned in these matters and are anxious to secure greater co-operation between the Dominion and the provinces and among the provinces themselves. If such an organization were formed, consisting, not entirely of officials, but of all who are interested, and if we met, say, once every two years, or more frequently if thought necessary, a great deal of good could be accomplished by our coming together as we have during the last two days, discussing our problems and endeavouring to co-operate in every way in the work that we are trying to promote. I merely make these few suggestions as an introduction to a discussion on the desirability of a permanent national organization of this kind.

MR. HARRIS: That thought was in my own mind. If we are to accomplish anything there must be presistent pressure, and we can only have that through the medium of an organization. What was in my mind was a committee of three from each province, who would be known as the National Wild Life Conservation Association, and who would, on all matters of general interest, bring in a finding or call together others in order that a finding might be arrived at. I believe that it would be good to start this now and to make a beginning while we are here. It would not be difficult for a representative from each province to suggest the names of two to the conservation committee of each province; then we could endeavour to get the approval of the Governments of the provinces and let them appoint a Government official. The Conservation Commission could work out the details if this organization would adopt the principle.

MR. MINER: For the last ten or fifteen years I have taken a great interest in the protection of our game. We have our Dominion

Government officials; are we interested enough in taking care of our game to meet with them at least once every two years and exchange our ideas and our plans in their presence? It is to our advantage as well as to theirs that we should do so; it is to their advantage to know what we want, so that they can work heart and hand with us. I think the suggestion is one that should be supported by everybody in the room.

Dominion Protection of Wild Life

HON. MR. DANIELS: If I apprehend the spirit of the suggestion I agree entirely with it. This matter of game protection should be not a Provincial but a Dominion matter. If my friend can gather together an organization for the conservation and protection of game such as we have in the Commission of Conservation for other natural resources of Canada, and can induce the Dominion Government to protect the game generally for us throughout Canada, it seems to me that such would be a proper plan; the Dominion Government is the body that should do the work for us. With one or two exceptions, all our provinces are suffering from small revenues. The Dominion Government, however seriously they may have to meet the present situation with regard to the war debt, has taken over the only source of revenue that the provinces ever looked forward to in order to fill their depleted treasuries —the income tax. It is only fair that this matter of game protection and the expenditure involved in it should largely fall on the Dominion treasury, and that the various provinces of Canada should be relieved of that burden.

Provinces feel the Financial Strain

In the Maritime Provinces, by reason of our depleted treasuries, it is almost impossible for us to branch out into any new field of endeavour, even in respect to the matter of game. We would like to see the game of our province protected and developed, but, with the resources which we have at hand, it is impossible for us to do that adequately. What I say about the Maritime Provinces applies also to nearly every province of Canada, except the two central provinces, which, of course, have tremendous resources that we have not. That is why I introduced a resolution this afternoon asking that, in the Maritime Provinces, at least, we should have a little reserve or park of some kind such as they have in the West. Millions of dollars have been spent in parks in the West; why should not the Maritime Provinces have something in that line. These parks might be made game sanctuaries and thus assist this great industry in the Maritime Provinces. If, therefore, my friend's idea is that this whole matter of game protection should be taken over by the Dominion Government,

it is one which I am sure every one in this room will be pleased to adopt, because that is the legitimate and proper source of protection for our game.

DR. HEWITT: I am sorry that I cannot claim credit for this proposal, because nothing was further from my mind than the interpretation that Mr. Daniels has put upon my suggestion. My idea is that we should have some form of national organization to consider questions relating to the better conservation of our wild life; it has nothing to do with the question of administration. The Dominion Government has its hands only too full at the present time, and is content to leave these matters to the provinces. This explanation is necessary, lest some of our friends from the eastern provinces might go away with the idea that silence means consent.

HON. Mr. DANIELS: I expected that.

British Columbia Game a Source of Revenue

DR. BAKER: We, in British Columbia, would object to the Dominion Government taking over the administration of our game. In our province it is quite a source of revenue; as a matter of fact, we have netted the British Columbia Government this year, under the Game Conservation Board, a little over $50,000 in profit. I assure you, therefore, that the Provincial Government would not like to see the Dominion Government take away that revenue. Our gross receipts up to January 1, only eight months of the current year, were over $75,000 for gun licenses; our expenditure was not quite $23,000. So we feel that the Government of British Columbia would not be very much in favour of the suggestion made by our friend Mr. Daniels.

The idea of a national convention of those interested in the protection of wild life is one of the best things that has been suggested here. The only objection I have is to the suggestion that we should meet only once in two years. I think that a convention such as we have held during the last two days should be held at least once a year, and called, as it has been this year, by the Commission of Conservation. Many things arise from year to year; we should meet yearly to discuss them. There is no question at all about the desirability of co-operation among the provinces, and the only way we can get co-operation is to meet annually and discuss the matters that are of vital interest to all of us. I am very much in favour of the convention being held at least once a year.

Beneficial Legislation as a Result of Conference

HON. A. E. ARSENAULT (Prince Edward Island): In our province we have a Provincial Fish and Game Association—in fact, we use it for the administration of the Game Act. There is no doubt that there



ROCKY MOUNTAIN SHEEP

Photo, Courtesy Mr. Dan McCowan



SHEEP AT THE SIDE OF THE NATIONAL HIGHWAY, NEAR BANFF, ALTA.

Photo, Courtesy Mr. Dan McCowan

63267

should be an organization in each province, and that a central organization would be most beneficial. It would bring these different organizations in the provinces together, and there would be more co-operation. I have heard a great many things at this conference, and some of the ideas which have been brought forward, especially with regard to what has been done in the province of Quebec, I propose to embody into legislation this spring. No doubt we can get a good deal of information from what is being done in the provinces. I think it is an excellent idea that such an association should be formed and meet periodically, whether once a year or once every two years.

Dr. A. Thompson, M.P., (Yukon): This is a matter in which the Yukon is specially interested. First, let me say that I am heartily in favour of the suggestion made by Dr. Hewitt, that this organization shall not cease but shall have some continuity. I am not in favour of having the two years interval between the meetings. If we do, interest is liable to die down, and the work would not be nearly so effective as if we met every twelve months.

As to the idea of the Federal Government taking this matter over, which was so eloquently presented by Hon. Mr. Daniels, I am not very enthusiastic. I have been in Parliament now for three terms, and every session I have heard this plea of poverty from the Maritime Provinces. I, myself, came from Nova Scotia; I was down there recently, and, in my judgment, it is one of the most prosperous sections of the whole Dominion. While Mr. Daniels referred to the income tax as having been annexed by the Federal Government, he was fair enough to say that it was because of the exigencies of the times. As a matter of fact, I believe that the income tax, so far as the Federal Government is concerned, will very shortly be modified, if not completely eliminated. Of course, I do not know about that, but I do know that Nova Scotia and New Brunswick have ample revenues to administer this branch of the public affairs.

Yukon a Large Fur Producer

As to the fur industry itself, the figures submitted to the conference this afternoon were to me very illuminating. I had no idea that the fur industry in Canada was productive of so large a revenue. I do not know how much fur we produce in the Yukon, but, judging from the figures given with regard to Quebec this afternoon, and also the figures submitted by Mr. Coats, I am satisfied that Yukon, if we knew how much it did produce, would be found to contribute a very considerable proportion to the millions that Canada as a whole produces. We have fur-trading stations there over vast stretches of territory and,

during the last thirty years, the fur business has been carried on in that country, and an enormous number of pelts is shipped from there every year.

Checking Value of Furs Sent by Mail

The Premier of Prince Edward Island has just said that he has obtained from this Conference some ideas which he intends to embody in legislation. That demonstrates the benefit of these meetings. But the idea I received this afternoon, which I intend to follow out for the purpose of checking up these vast natural resources of ours, particularly so far as the Yukon territory is concerned, is this: I know that, every year, thousands of dollars worth of fur is shipped out of Yukon by mail to London and St. Louis. We should keep track of these things, and that is a field in which an organization of this kind can operate with great success, with a view to finding out how to develop the trade and protect these vast natural resources which we find in every part of Canada from Prince Edward Island to Yukon. If we meet regularly, and, if the people who are interested in this great industry know that here in the Capital we have a body that includes within its membership men capable of considering and dealing with the various phases of this question, we should be able to do a great deal of good. Yukon 'is on the map' so far as this is concerned.

Those who Benefit should Pay the Cost

MR. BENJAMIN LAWTON: The idea is an excellent one, and the meeting should be an annual affair. I suggest that those provinces which have not adopted the licensing system lose no time in doing so. It is only proper that those who benefit by the hunting of game and fur-bearing animals should at least bear a proportion of the cost of protecting them. Only a small proportion of the population of any country enjoys the sport of hunting. A few years ago the statistics of the United States showed that only about ten per cent of the population at most came under this class; why should ninety per cent of the population pay the entire cost of protecting the game of any country? I think a proper move would be to enact legislation requiring those who benefit by one of the natural resources of the country to contribute at least a large proportion of the cost of protecting it. As I stated yesterday, since the organization of the Game Protection Branch in Alberta in 1906, we have had a surplus of some $40,000 over and above the cost of protection. The provinces which have not adopted legislation of this kind should lose no time in following the example set by the United States and followed by many of the provinces of Canada.

MR. F. BRADSHAW: I am heartily in accord with the suggestion made by Dr. Hewitt. I have attended the International Conference

in the United States, and I can say that I have received more information and more inspiration at this assembly than I have at the International Conference.

I suggest that it is advisable that the Conference be not always held at Ottawa, because some of the western members, especially those from Yukon and British Columbia, have to go to considerable trouble and expense to make the trip east. If we could centralize the place of meeting it would perhaps be better for all concerned. However, that is a matter that can be given consideration when we have finally decided to organize as suggested.

Mr. E. T. D. Chambers: I feel that it would be an excellent thing if we could have an annual convention of this kind. Perhaps it might be desirable to create a new society, but I do not know that we can improve on a convention of this kind, called under the ægis of the Commission of Conservation. It appears to me that an annual convention of this kind just about meets the situation.

Mr. Harris: It seems to be generally agreed that it is a good thing to have a national organization which will meet annually. I move that this matter be referred to the Commission of Conservation to take action.

The motion, which was seconded by Mr. Chambers, was carried.

Mr. James White: We have had with us during our deliberations a lady delegate— it is the first time that we have had a member of the fair sex with us—in the person of Mrs. Dwyer, Secretary-treasurer of the Province of Quebec Society for the Protection of Birds. I know that I am voicing the sentiments of every member of the conference who is present and of those who have attended the other sessions when I say that we highly appreciate the honour which has been conferred upon us by Mrs. Dwyer.

Death of Sir Wilfrid Laurier

Sir James Grant: Since we have assembled here within the last few days one of the greatest intellectual lights of the century has suddenly passed away. Sir Wilfrid Laurier took a deep and abiding interest in the conservation of the resources of Canada, as did the late Theodore Roosevelt in his own country. Both these men are gone, but they have left an imperishable record. I wish to move the following resolution:

"That this Conference on Wild Life Protection, meeting with the Commission of Conservation, has learned with the most profound regret of the sudden death of the Right Honourable Sir Wilfrid Laurier, ex-Premier of the Dominion, and desires to convey to Lady Laurier its warmest sympathies in the midst of this trying affliction."

Sir Wilfrid for years was the pride and hope of our people, loved and respected by all classes for his warmth of heart, geniality of disposition, nobility of character, and marked intellectual ability, with a power and eloquence of expression, the gift of few and the admiration of many. His name will go down to posterity as the Gladstone of Canada, cherished far and near for ages to come, the pride and admiration of a wide circle of friends and admirers at home and abroad, where it has been a household word during the present century.

Dr. Bryce: I beg to second the motion, in the absence of Senator Edwards, who, I understand, was to have been the seconder.

A great sadness has come over us since we met here; the death of this great man has come to us as a shock. It was my pleasure to know Sir Wilfrid for twenty years. My educational position in Manitoba brought me in touch with some of our difficulties there, and no one was so thoughtful, so careful and so anxious to make things smooth and to bring them out right as Sir Wilfrid was. During the twenty years that I have known him I have never come to Ottawa without expecting to see him, and I had hoped to see him when I came here to attend this meeting. I did not always agree with Sir Wilfrid. The last time I talked to him with regard to the unusual conditions resulting from the war, I said to him: "The West, Sir Wilfrid, is going for conscription; you can depend on that"—and it did. But he was a man of broad sympathies. He did a great work; he did all he could to smooth down our difficulties in Canada. He was a just and kindly

man, a man whom you could admire in every way. We may not have many more like him, but let us hope that we shall have men in public life who will stand out for truth and righteousness. One thing that impressed me with regard to Sir Wilfrid Laurier was that, when I was in the Old Country, the people in Edinburgh, Birmingham, Sheffield and London seemed to know Sir Wilfrid as well as we did. Therefore, it gives me a kind of sad pleasure to second this resolution. We have lost a great Canadian, whom we all loved, whether we agreed with him politically or not. He was every inch a man, and he did great good for Canada.

Dr. Murray: It is universally acknowledged that one of the greatest of Canadians and one of the greatest of the world's statesmen has passed away. I would ask those present to signify their approval of this resolution by a standing silent vote.

The resolution was unanimously adopted by a standing vote.

Dr. Murray: This brings the business of our meeting to a close. I think it will be agreed that the meetings have been very interesting and that they will prove useful. Indeed, we have had evidence that some of the suggestions made by various speakers are to be put into effect immediately. I hope that this will be only the first of a series of these conventions, each of which will be more interesting and more useful than the one which preceded it.

APPENDIX I

The Migratory Birds Convention Act

(7-8 George V, chap. 18; assented to Aug. 29, 1917)

WHEREAS on the sixteenth day of August, one thousand nine hundred and sixteen, a Convention was signed at Washington respecting the protection of certain migratory birds in Canada and the United States, and ratifications were exchanged at Washington on the seventh day of December, one thousand nine hundred and sixteen; and whereas it is expedient that the said Convention should receive the sanction of the Parliament of Canada and that legislation be passed for insuring the execution of the said Convention: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. This Act may be cited as *The Migratory Birds Convention Act.*

2. The said Convention of the sixteenth day of August, one thousand nine hundred and sixteen, which is set forth in the Schedule to this Act, is hereby sanctioned, ratified, and confirmed.

3. In this Act and in any regulation made thereunder, unless the context otherwise requires—

(*a*) " Close season " means the period during which any species of migratory game, migratory insectivorous or migratory nongame bird is protected by this Act or any regulation made under this Act;

(*b*) " Migratory game birds " means—

Anatidæ or waterfowl, including brant, wild ducks, geese, and swans;

Gruidæ or cranes, including little brown, sandhill, and whooping cranes;

Rallidæ or rails, including coots, gallinules, and sora and other rails;

Limicolæ or shorebirds, including avocets, curlew, dowitchers, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, stilts, surf birds, turnstones, willet, woodcock, and yellowlegs;

Columbidæ or pigeons, including doves and wild pigeons;

(*c*) " Migratory insectivorous birds " means—

Bobolinks, catbirds, chickadees, cuckoos, flickers, flycatchers, grosbeaks, humming birds, kinglets, martins, meadowlarks, nighthawks, or bull bats, nuthatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, waxwings, whippoorwills, woodpeckers, and wrens, and all other perching birds which feed entirely or chiefly on insects;

(*d*) "Migratory nongame birds" means—
Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murres, petrels, puffins, shearwaters, and terns;
(*e*) "Minister" means the Minister of the Interior;
(*f*) "Regulation" means any regulation made under the provisions of section four of this Act.

4. (1) The Governor in Council may make such regulations as are deemed expedient to protect the migratory game, migratory insectivorous and migratory nongame birds which inhabit Canada during the whole or any part of the year.

(2) Subject to the provisions of the said Convention, such regulations may provide—

(*a*) The periods in each year or the number of years during which any such migratory game, migratory insectivorous, or migratory nongame birds shall not be killed, captured, injured, taken, molested, or sold, or their nests or eggs injured, destroyed, taken, or molested;

(*b*) For the granting of permits to kill or take migratory game, migratory insectivorous and migratory nongame birds, or their nests or eggs;

(*c*) For the prohibition of the shipment or export of migratory game, migratory insectivorous or migratory nongame birds or their eggs from any province during the close season in such province, and the conditions upon which international traffic in such birds shall be carried on;

(*d*) For the prohibition of the killing, capturing, taking, injuring, or molesting of migratory game, migratory, insectivorous or migratory nongame birds, or the taking, injuring, destruction or molestation of their nests or eggs, within any prescribed area;

(*e*) For any other purpose which may be deemed expedient for carrying out the intentions of this Act and the said Convention, whether such other regulations are of the kind enumerated in this section or not.

(3) A regulation shall take effect from the date of the publication thereof in the *Canada Gazette*, or from the date specified for such purpose in any regulation, and such regulation shall have the same force and effect as if enacted herein, and shall be printed in the prefix, in the next succeeding issue of the Dominion Statutes, and shall also be laid before both Houses of Parliament within fifteen days after the publication thereof if Parliament is then sitting, and if Parliament is not then sitting, within fifteen days after the opening of the next session thereof.

5. (1) The Minister may appoint game officers for carrying out this Act and the regulations, and may authorize such game officers to exercise the powers of Justice of the Peace or the powers of a Police Constable. Such persons shall hold office during pleasure, and shall have, for the purpose of this Act and the said Convention,

such other powers and duties as may be defined by this Act and the regulations.

(2) Every game officer who is authorized by the Minister to exercise the powers of a Justice of the Peace or of a Police Constable shall, for all the purposes of this Act, and the regulations, be *ex officio* a Justice of the Peace or a Police Constable, as the case may be, within the district within which he is authorized to act.

(3) Every such game officer shall take and subscribe an oath in the following form, that is to say:

"I, A.B., a of

do solemnly swear that to the best of my judgment I will faithfully, honestly, and impartially fulfil, execute, and perform the office and duties of such

according to the true intent and meaning of *The Migratory Birds Convention Act* and the regulations made thereunder.

So help me God."

6. No one without lawful excuse, the proof whereof shall lie on him, shall buy, sell, or have in his possession, any bird, nest, or egg or portion thereof, during the time when the capturing, killing, or taking of such bird, nest, or egg is prohibited by law.

7. All guns, ammunition, boats, skiffs, canoes, punts, and vessels of every description, teams, wagons, and other outfits, decoys and appliances of every kind, used in violation of or for the purpose of violating this Act or any regulation, and any bird, nest, or egg taken, caught, killed, or had in possession, in violation of this Act or any regulation, may be seized and confiscated upon view by any game officer appointed under this Act, or taken and removed by any person for delivery to any game officer or justice of the peace.

8. Any game officer appointed under this Act who violates this Act or any regulation, or who aids, abets, or connives at any violation of this Act or of any regulation, shall be liable, upon summary conviction before any recorder, commissioner of police, judge of the sessions of the peace, police stipendiary or district magistrate, or any two justices of the peace, to a penalty not exceeding five hundred dollars and costs or six months' imprisonment and not less than one hundred dollars and costs or three months' imprisonment.

9. Any person who assaults, obstructs, or interferes with any game officer or peace officer in the discharge of any duty under the provisions of this Act, or of any regulation, shall be guilty of a violation of this Act.

10. Any person who wilfully refuses to furnish information or wilfully furnishes false information to a game officer or peace officer respecting a violation of this Act or of any regulation, the existence of or the place of concealment of any bird, nest, or egg, or any portion thereof captured, killed, or taken in violation of this Act or of any regulation, shall be guilty of a violation of this Act.

11. Any game officer or peace officer may enter any place or premises in which he has reason to believe there exists migratory game, or migratory insectivorous, or migratory nongame birds, nests or eggs, or any parts thereof, in respect of which a breach of this

Act or of the regulations may have been committed, and may open and examine any trunk, box, bag, parcel, or receptacle which he has reason to suspect and does suspect contains any such bird, nest, or egg, or any part thereof.

12. Every person who violates any provision of this Act or any regulation shall, for each offence, be liable upon summary conviction to a fine of not more than one hundred dollars and not less than ten dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment.

SCHEDULE

Convention

Whereas many species of birds in the course of their annual migrations traverse certain parts of the Dominion of Canada and the United States; and

Whereas many of these species are of great value as a source of food or in destroying insects which are injurious to forests and forage plants on the public domain, as well as to agricultural crops, in both Canada and the United States, but are nevertheless in danger of extermination through lack of adequate protection during the nesting season or while on their way to and from their breeding grounds;

His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British dominions beyond the seas, Emperor of India, and the United States of America, being desirous of saving from indiscriminate slaughter and of insuring the preservation of such migratory birds as are either useful to man or are harmless, have resolved to adopt some uniform system of protection which shall effectively accomplish such objects, and to the end of concluding a convention for this purpose have appointed as their respective plenipotentiaries:

His Britannic Majesty, the Right Honourable Sir Cecil Arthur Spring-Rice, G.C.V.O., K.C.M.G., etc., His Majesty's ambassador extraordinary and plenipotentiary at Washington; and

The President of the United States of America, Robert Lansing, Secretary of State of the United States;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and adopted the following articles:

Article I—The High Contracting Powers declare that the migratory birds included in the terms of this Convention shall be as follows:

1. Migratory Game Birds—

(*a*) Anatidæ or waterfowl, including brant, wild ducks, geese, and swans.

(*b*) Gruidæ or cranes, including little brown, sandhill, and whooping cranes.

(*c*) Rallidæ or rails, including coots, gallinules, and sora and other rails.

(*d*) Limicolæ or shorebirds, including avocets, curlew, dowitchers, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, stilts, surf birds, turnstones, willet, woodcock, and yellowlegs.

(*e*) Columbidæ or pigeons, including doves and wild pigeons.

2. Migratory Insectivorous Birds—

Bobolinks, catbirds, chickadees, cuckoos, flickers, flycatchers, grosbeaks, humming birds, kinglets, martins, meadowlarks, nighthawks or bull bats, nuthatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, waxwings, whippoorwills, woodpeckers, and wrens, and all other perching birds which feed entirely or chiefly on insects.

3. Other Migratory Nongame Birds—

Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murres, petrels, puffins, shearwaters, and terns.

Article II—The High Contracting Powers agree that, as an effective means of preserving migratory birds there shall be established the following close seasons during which no hunting shall be done except for scientific or propagating purposes under permits issued by proper authorities.

1. The close season on migratory game birds shall be between 10th March and 1st September, except that the close of the season on the limicolæ or shorebirds in the Maritime Provinces of Canada and in those states of the United States bordering on the Atlantic ocean which are situated wholly or in part north of Chesapeake bay, shall be between 1st February and 15th August, and that Indians may take at any time scoters for food but not for sale. The season for hunting shall be further restricted to such period not exceeding three and one-half months as the High Contracting Powers may severally deem appropriate and define by law or regulation.

2. The close season on migratory insectivorous birds shall continue throughout the year.

3. The close season on other migratory non-game birds shall continue throughout the year, except that Eskimos and Indians may take at any season auks, auklets, guillemots, murres, and puffins, and their eggs for food and their skins for clothing, but the birds and eggs so taken shall not be sold or offered for sale.

Article III—The High Contracting Powers agree that during the period of ten years next following the going into effect of this Convention there shall be a continuous close season on the following migratory game birds, to wit:

Band-tailed pigeons, little brown, sandhill, and whooping cranes, swans, curlew, and all shorebirds (except the black-breasted and golden plover, Wilson or jack snipe, woodcock, and the greater and lesser yellowlegs); provided that during such ten years the close seasons on cranes, swans, and curlew in the province of British Columbia shall be made by the proper authorities of that province

within the general dates and limitations elsewhere prescribed in this Convention for the respective groups to which these birds belong.

ARTICLE IV—The High Contracting Powers agree that special protection shall be given the wood duck and the eider duck either (1) by a close season extending over a period of at least five years, or (2) by the establishment of refuges, or (3) by such other regulations as may be deemed appropriate.

ARTICLE V—The taking of nests or eggs of migratory game or insectivorous or nongame birds shall be prohibited, except for scientific or propagating purposes under such laws or regulations as the High Contracting Powers may severally deem appropriate.

ARTICLE VI—The High Contracting Powers agree that the shipment or export of migratory birds or their eggs from any state or province, during the continuance of the close season in such state or province, shall be prohibited except for scientific or propagating purposes, and the international traffic in any birds or eggs at such time captured, killed, taken, or shipped at any time contrary to the laws of the state or province in which the same were captured, killed, taken, or shipped shall be likewise prohibited. Every package containing migratory birds or any parts thereof or any eggs of migratory birds transported, or offered for transportation from the Dominion of Canada into the United States, or from the United States into the Dominion of Canada, shall have the name and address of the shipper and an accurate statement of the contents clearly marked on the outside of such package.

ARTICLE VII—Permits to kill any of the above-named birds which, under extraordinary conditions, may become seriously injurious to the agricultural or other interests in any particular community, may be issued by the proper authorities of the High Contracting Powers under suitable regulations prescribed therefor by them respectively, but such permits shall lapse or may be cancelled, at any time when, in the opinion of said authorities, the particular exigency has passed, and no birds killed under this article shall be shipped, sold, or offered for sale.

ARTICLE VIII—The High Contracting Powers agree themselves to take, or propose to their respective appropriate law-making bodies, the necessary measures for insuring the execution of the present Convention.

ARTICLE IX—The present Convention shall be ratified by His Britannic Majesty and by the President of the United States of America, by and with the advice and consent of the Senate thereof. The ratifications shall be exchanged at Washington as soon as possible and the Convention shall take effect on the date of the exchange of the ratifications. It shall remain in force for fifteen years, and in the event of neither of the High Contracting Powers having given notification, twelve months before the expiration of said period of fifteen years, of its intention of terminating its operation, the Convention shall continue to remain in force for one year and so on from year to year.

In faith whereof, the respective Plenipotentiaries have signed the present Convention in duplicate and have hereunto affixed their seals.

Done at Washington this sixteenth day of August, 1916.

(L.S.) Cecil Spring-Rice
(L.S.) Robert Lansing

APPENDIX II

The Northwest Game Act

(7-8 George V, chapter 36; assented to September 20, 1917)

HIS Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. This Act may be cited as *The Northwest Game Act.*

2. In this Act and in the regulations, unless the context otherwise requires,—

(*a*) " Minister " means the Minister of the Interior;

(*b*) " Game Officer " means a game officer appointed as such under or by the provisions of this Act or the regulations;

(*c*) " Game Warden " means a game warden appointed as such under the provisions of this Act or the regulations;

(*d*) " Game " means and includes all wild mammals and wild birds protected by this Act or by any regulation, and the heads, skins, and every part of such mammals and birds;

(*e*) " Close season " with respect to any kind of game means the period during which the hunting, killing, destroying, injuring, trapping, taking, capturing, selling, trading in or molesting of such kind of game is prohibited or restricted by this Act or by any regulation;

(*f*) " Open season " with respect to any kind of game means the period during which such kind of game may be hunted, killed, destroyed, trapped, taken, captured, sold, traded in, or possessed;

(*g*) " Regulation " means any regulation made by the Governor General in Council under the authority of this Act;

(*h*) " Northwest Territories " means the Northwest Territories formerly known as Rupert's Land and the Northwestern Territory (except such portions thereof as are included in the provinces of Ontario, Quebec, Manitoba, Saskatchewan, and Alberta, and Yukon) together with all British territories and possessions in North America and all islands adjacent thereto not included within any province except the colony of Newfoundland and its dependencies.

3. This Act shall apply to the Northwest Territories.

4. (1) Except as hereinafter provided, the following shall not be hunted, trapped, taken, killed, shot at, wounded, injured, or molested in any way during the following times of year respectively:

(*a*) Moose, deer, and mountain goat, between the first day of April and the first day of September;

(*b*) Caribou and mountain sheep, between the first day of April and the first day of August, and between the first day of October and the first day of December;

(*c*) Mink, fisher, and marten, between the fifteenth day of March and the first day of November;

(*d*) Otter and beaver, between the fifteenth day of May and the first day of October;

(*e*) Muskrat, between the fifteenth day of May and the first day of October;

(*f*) White fox, between the first day of April and the fifteenth day of November;

(*g*) Partridge, prairie chicken, ptarmigan, and other species of grouse, between the first day of January and the first day of September;

(*h*) Wild geese and wild duck, with the exception of eider duck, between the fifteenth day of December and the first day of September.

(2) Except as hereinafter provided, no eggs in the nest of any of the said birds or in the nest of any other species of wild fowl, shall be taken, destroyed, injured, or molested at any time of the year.

(3) Notwithstanding anything contained in subsections one and two, the game therein mentioned may be lawfully hunted, taken or killed, and the eggs of birds therein mentioned may be lawfully taken by Indians or Eskimos who are *bona fide* inhabitants of the Northwest Territories, or by other *bona fide* inhabitants of the said territories, and by explorers or surveyors who are engaged in any exploration, survey or other examination of the country, but only when such persons are actually in need of such game or eggs to prevent starvation.

(4) Except as hereinafter provided, buffalo, or bison shall not be hunted, trapped, taken, killed, shot at, wounded, injured, or molested at any time of the year.

(5) Except as hereinafter provided, musk-ox and wapiti or elk shall not be hunted, trapped, taken, killed, shot at, wounded, injured or molested at any time of the year, except in such zones and during such period as the Governor in Council may prescribe.

(6) Except as hereinafter provided, white pelicans shall not be hunted, trapped, taken, killed, shot at, wounded, injured, or molested at any time of the year.

(7) Except as hereinafter provided, the following shall not be hunted, trapped, taken, killed, shot at, wounded, injured, or molested in any way:

(*a*) Wild swan, until the first day of January, one thousand nine hundred and twenty-eight.

(*b*) Eider duck, until the first day of January, one thousand nine hundred and twenty-three.

(8) Notwithstanding the provisions of subsections one, two, four, five, and six, the Minister or any officer or person authorized by him, may issue a permit to any person to take or kill at any time such mammals and birds, or take the eggs or nests of birds, for scientific or propagation purposes.

(9) Excepting a native-born Indian, Eskimo, or halfbreed, who is a *bona fide* resident of the Northwest Territories, no person shall

engage in hunting, trapping, or trading or trafficking in game, without first securing a license so to do.

(*a*) The fees for such licenses when issued to a *bona fide* resident of the Northwest Territories shall be:—
For hunting and trapping, two dollars.
For trading or trafficking, five dollars.

(*b*) The fees for such licenses, when issued to non-residents of the Northwest Territories, shall be fixed by the Governor in Council.

(10) The Governor in Council may make regulations—

(*a*) Regulating or prohibiting the use or possession of poison, ammunition, explosives, traps, snares, spring-guns, firearms, and other implements, appliances, and contrivances for hunting, killing, taking, trapping, destroying, or capturing game: Provided that such prohibition shall not apply to such types of guns, rifles, traps, and ammunition as are now in common use;

(*b*) Permitting the hunting, killing, taking, capturing, or trapping of specimens of game for scientific or propagation purposes;

(*c*) Governing the issue of licenses and permits, and prescribing the terms and conditions thereof:

(*d*) Authorizing the appointment by the Minister of game officers and game wardens, and prescribing their duties;

(*e*) Regulating the possession of and transportation of game;

(*f*) Governing the number of mammals and birds that may be killed or taken by any person in one season;

(*g*) For any other purpose which may be deemed expedient for carrying out the provisions and intentions of this Act, whether such regulations are of the kind enumerated or not.

(11) Any regulation made under the provisions of this section may be made to apply to the whole or any part of the Northwest Territories.

5. No one shall enter into any contract or agreement with or employ any Indian, Eskimo, or other person, whether such Indian, Eskimo, or other person is an inhabitant of the country to which this Act applies or not, to hunt, trap, kill, or take game contrary to the provisions of this Act or a regulation; or to take, contrary to the provisions of this Act or a regulation, any egg, nest, or part thereof.

6. All members of the Royal Northwest Mounted Police, and the sub-collector of Customs at Herschel island, shall be ex-officio game officers.

7. (1) Any game officer, when he considers it necessary so to do, may appoint a constable or constables to apprehend any person who has done, or who he has reason to believe has done, anything in contravention of any of the provisions of this Act or the regulations.

(2) Such constable shall, upon apprehending such person, arrest him and bring him for trial before the nearest justice of the peace, together with any game, eggs, or nests, or parts thereof, protected

by this Act or a regulation, found in the possession of such person at the time of his apprehension.

8. No person without lawful excuse, the proof whereof shall lie on him, shall buy, sell, or have in his possession any game, or the nests or eggs of any wild bird, or any part thereof, during the close season.

9. (1) All guns, ammunition, traps, boats, skiffs, canoes, punts, and vessels of every description, horses, dogs, wagons, sleighs, and other outfits, decoys, and appliances, and materials of every kind, used in violation of or for the purpose of violating this Act or any regulation, may be seized upon view by any game officer or game warden, or taken and removed by any person appointed for such purpose by a game officer or game warden, for delivery to a justice of the peace, who may order such chattels to be held pending the payment of any penalty for any offence committed.

(2) (*a*) Any game taken, caught, killed, or had in possession, or any nest or egg or parts thereof taken or had in possession, in violation of this Act, or any regulation; and,

(*b*) Any poison, ammunition, explosives, traps, snares, spring-guns, fire-arms, and other implements, appliances, and contrivances, the use of which is prohibited under the provisions of this Act;

may be seized on view by any peace officer, game officer, or game warden, and shall be forfeited to the Crown.

10. Any game officer, game warden, or peace officer who violates this Act or any regulation, or who aids, abets or connives at any violation of this Act or of any regulation, shall be liable upon summary conviction to a penalty not exceeding five hundred dollars and not less than one hundred dollars, or to imprisonment for any term not exceeding six months, or to both fine and imprisonment.

11. Any person who assaults, obstructs, or interferes with any game officer, game warden, constable, or other peace officer, in the discharge of any duty under the provisions of this Act or of any regulation, shall be guilty of a violation of this Act.

12. Any person who wilfully furnishes false information to a game officer, game warden, or peace officer respecting a violation of this Act or of any regulation, the existence of or the place of concealment of any game, nest, or egg, or portion thereof, captured, killed, or taken in violation of this Act or of any regulation, shall be guilty of a violation of this Act.

13. Any game officer, game warden, constable, or other peace officer may enter any place, building, or premises, or any ship, vessel, or boat in which he has reason to believe there exist game, nests, or eggs, or any parts thereof in respect to which a breach of this Act or of the regulations has been committed, and may open and examine any trunk, box, bag, parcel, or other receptacle which he has reason to suspect and does suspect contains any such game, nest or egg or any part thereof.

14. Any person found committing an offence against this Act may be arrested on view by any game officer, game warden, or peace officer.

15. Every justice of the peace may upon his own view convict for any offence against this Act or a regulation.

16. The killing, taking, trapping, or capturing of each mammal or bird contrary to the provisions of this Act or a regulation, shall constitute a separate offence.

17. Every game officer and every game warden shall, before acting, take and subscribe to the following oath:—

A. B. , game officer (or game warden), appointed under the provisions of *The Northwest Game Act* and the regulations, do swear that to the best of my judgment I will faithfully, honestly, and impartially execute and perform the office and duty of such game officer (or game warden) according to the true intent and meaning of *The Northwest Game Act* and the regulations. So help me God.

18. Any person who violates any of the provisions of this Act for which no other penalty is provided, or of any regulation, shall be guilty of an offence and shall be liable on summary conviction to,—

(*a*) A fine not exceeding five hundred dollars or less than one hundred dollars, or to imprisonment for any term not exceeding six months, or to both fine and imprisonment, for any offence against subsections four and five of section four;

(*b*) A fine not exceeding two hundred dollars or less than fifty dollars, or to imprisonment for any term not exceeding three months, or to both fine and imprisonment, for any offence under subsection nine of section four, or under section eleven;

(*c*) A fine not exceeding one hundred dollars or less than five dollars, or to imprisonment for any term not exceeding two months, or to both fine and imprisonment, for any other offence against this Act or a regulation.

19. When because of the distance, or for want of conveyance or communication, or for any other cause, it is not convenient to confine any convicted person in the nearest gaol, or other place of confinement, the convicting authority shall have power to confine such person in any suitable building which is more convenient to the place of trial, and to take all necessary precautions to prevent his escape therefrom.

20. (1) Whenever by this Act it is made an offence to do any act without holding a license therefor, the onus in any prosecution shall be upon the person charged, to prove that he was the holder of the license required by this Act.

(2) In any prosecution under this Act the onus of proof as to his *bona fide* residence in the Northwest Territories shall be upon the defendant.

21. Chapter one hundred and fifty-one of the Revised Statutes of Canada, 1906, is hereby repealed.

Index

PAGE

ABITIBI district, depredations by Indians in 30
Advisory Board on Wild Life Protection 2, 3, 8, 11, 12, 14, 58, 113, 115, 116, 117, 140, 145, 148
Adirondack mountains 61
African game killed during war 95
Agriculture, Department of 2, 11
Aigrettes, traffic in 79
Alabama, migration of ducks to 86
Alaska 60, 120
  sale of game in 64
Alaska Central railway 63
Alaska, gulf of 120
Alaska Game Act 67
Alberta 108, 131, 132, 146, 165
  game protection in 52
  migration of ducks to 86
  spring shooting in 102
Alberta Game Act 115
Alberta Game Protection Branch 154
Aleutian islands 120
Algonquin park, beaver in 31
Allen, W. H 70, 71
Alpine Club of Canada 47
American Game Protective Association 2, 94, 95
Anatidae 158, 161
Anderson, Dr. R. M 2
Antelope 52, 53, 97, 108
Arsenault, Hon. A. E 1, 118, 119, 121, 129, 131, 152
Atlantic ocean 162
Atlin district, B.C 70
  slaughter of moose in 30
Auk 159, 162
Auklet 159, 162
Automatic rifle 131, 132
Automatic shotgun 52, 130, 131
Autumn shooting 119, 121
Avocet 158, 162

BAG limits 77
Baker, Dr. A. R 2, 16, 30, 39, 41, 69, 100, 101, 102, 116, 119, 121, 129, 130, 131, 132, 146, 147, 148, 149, 152
Baker, U. S. Secretary of War 95
Banff, Alta 46, 51
'Barren lands' 4
Barrow, point 64
Battle river 55
Bears 142
  black 47
Beaver 55, 124, 125, 129, 166
  in Algonquin park 31
  in Laurentides National park 50
  in New Brunswick 33
  in Nova Scotia 34
  slaughter of 29
  traffic in 97
Bellisle, J. A. 1, 39, 105, 117, 118, 121, 122, 127, 128, 129, 131, 138, 139
Bering sea 120
Bighorn sheep, killing of 31

PAGE

Biological Survey, U. S. Dept. of Agriculture....2, 73, 74, 75, 76, 77, 78, 108, 109, 110, 111, 112
Birmingham, England 157
Birds, insectivorous....4, 76, 92, 158, 162
migration of 76
migratory....158, 159, 161
nest boxes for 93
Bird rocks, gulf of St. Lawrence 7
Bison 166
Bittern....92, 159, 162
Black, Robson 2
Blackbird 94
Bluebirds 93
Blue Mountain district 92
Bobolinks....158, 162
damage to rice by 109
Boers 96
Bonaventure island, Que 7
Bow river 53
Bradshaw, F....2, 21, 28, 41, 69, 103, 154
Brant....119, 158, 161
British Columbia....120, 130, 132, 146, 152, 155, 162
administration of game law in....116, 117
attitude of sportsmen of....100, 102
depredations by Indians in 30
firearm regulations of 52
fur-traders' licenses in 140
Game Conservation Board....2, 16, 116
no sale of game in 69
open season in 101
British North America Act 115
Bryan Company 138
Bryce, Dr. George....1, 38, 103, 145, 156
Buffalo 53, 166
Buffalo, N. Y 90
Buffalo park, Alta....13, 47, 51, 53
Bull bat....158, 162
Bunting, indigo 92
Burnham, J. B....2, 90, 94, 95
Burrell, Hon. Martin 1

CALGARY, Alta 53
California....108, 109
Canada....8, 11, 14, 15, 44, 45, 55, 62, 64, 65, 66, 68, 71, 74, 77, 83, 96, 98, 108, 110, 119, 135, 142, 150, 151, 154, 156, 163, 165
fur production of 17, 153
game preserves in 57
northern....6, 60, 62, 63, 65
protection of migratory birds in....158, 161
southern 78
western 54
Canada Gazette 159
Canada goose....44, 110, 116, 147
character of 89, 90
Canadian Forestry Association 2
Canadian Northern railway 36, 51
Canadian Pacific railway 38, 53
Camp Fires in the Canadian Rockies 59
Canvasback duck 76, 80
Cape Breton island, caribou in 35, 40
Cariboo district, B. C 70
Caribou....4, 52, 67, 143, 165
in Nova Scotia 35
sale of 63

PAGE
Cassiar, B. C., slaughter of moose in 30
Catbird 158, 162
Cats, dangerous to birds 94
Census, decennial 135
Census of industries 134
Chambers, E. T. D 1, 29, 105, 132, 138, 155
Chapala, lake 78
Chesapeake bay 76, 86, 162
Chickadee 158, 162
Chilcotin district, Indians of 30, 31
Chipewyan, Alta 138
Choquette, Mgr. C. P 1
Churchill, fort 64
Cleveland, Ohio 70
Close season 158, 165
Clubs, fish and game 122
Coast mountains 120
Coats, R. H 133, 134, 139, 153
Colonization, Mines and Fisheries (Quebec), Dept. of 123
Columbidae 158, 162
Commission of Conservation 2, 3, 8, 12, 13, 15, 122, 146, 147, 148, 150, 151, 152, 155
Cooking Lake reserve 53
Coot 106, 107, 158, 162
Coyotes, damage to sheep by 38
Cranes 103, 158, 161, 162
  protection of 104
  whooping 77
  wintering of 78
Criddle, N 2, 104
Crow, Prof. J. W 93, 94
Crowley, Rev. T. J 2, 43, 145
Cross fox 129
Cuckoo 92, 158, 162
Curlew 158, 162
Customs, Dept. of 125
Cutworm 83
Cypress hills, Alta 53

DAIRY Branch, Dominion Dept. of Agriculture 134
Dakota, North and South 76
Daniels, Hon. O. T 1, 39, 41, 45, 59, 73, 115, 151, 152, 153
Deer 52, 124, 165
  black-tailed 52
  Ontario fees for 141
  plentiful near Banff 46
  slaughter of 31
'Delilah,' life history of 84, 85, 90
Depletion of wild life, threatened 9
Detroit, Mich 86
Deuteronomy, reference to 82
Does, killing of 61
Dogs, running of 143
Dominion Govt., protection of wild life by 11
Dominion jurisdiction, over game 114–118, 151, 152
  over Indians 146
  over migratory birds 99, 101, 103, 105
Dominion parks, protection of game in 11
Dominion Parks Act 13
Dominion Parks Branch 3, 46, 51
Dove 158, 162
  mourning 110
Dowitcher 158, 162

PAGE

Ducks, canvasback ... 76, 80
destruction of salmon by ... 107
fish ... 110
harassing of ... 76
migration of ... 104
sea ... 107
wintering of ... 78
wild ... 107, 120, 158, 161, 166
wild, damage by ... 103, 108
Dwyer, Mrs. W. F. L ... 2, 155

EDINBURGH, Scotland ... 157
Edmonton, Alta ... 53, 138
Edwards, Hon. Senator ... 2, 6, 31, 45, 81, 156
Eggs, protection of birds' ... 163, 166
Eider duck ... 166
Elk ... 52, 53, 112, 166
increasing near Lamont, Alta ... 51
slaughter of ... 23
Elk Island park, Alta ... 13, 51, 53
Ely, Mr ... 93
English Game Guild ... 95
Erie, lake ... 86
Ermine ... 124, 129
Eskimos ... 5, 60
privileges of ... 162, 166
Essex County Wild Life Conservation Association ... 2, 44, 45, 141, 142, 145

FAIRBANKS, Alaska ... 63, 67
Federal (U. S.) jurisdiction over migratory birds (see also 'Dominion jurisdiction') ... 75, 111, 112
Female hoofed game ... 66
Finlanders, slaughter of game by ... 43
Firearms ... 49, 52
Fish and Game Association, Prince Edward Island ... 152
Fish and Game Dept., Quebec ... 105
Fisher ... 166
Fishermen, dependence of, on game ... 106, 107
Fishing leases ... 122
Flicker ... 93, 158, 162
Flies, destroyed by swallows ... 83
Flycatcher ... 158, 162
Fox, black ... 129
white ... 166
Foxes ... 142
stamping of skins of ... 129
Foremost Antelope reserve ... 13
Fort à-la-Corne ... 26
Fort George, Que ... 89
Fort Yukon, Alaska ... 97
France, game killed in ... 95
Fraser, Colin ... 138
Frontier regions ... 66
Frontiersmen ... 60
Fulmar ... 159, 162
Fur-dealers, co-operation by ... 124
Fur-farming in New York state ... 98
Furs, exports and imports of ... 137
Government sale of ... 56
mail shipments of ... 154
manufactures from ... 136
stamping of ... 123, 124
Fur shipments, checking of ... 139

PAGE
Fur statistics....124, 133, 134
collating of.... 138
in British Columbia.... 17
memorandum on.... 135
Fur trade, regulation of....10, 34, 37, 121, 122, 126, 128, 143
Fur traders' licenses.... 129, 167

GAGNON, L. A.... 1, 33
Gallinule....158, 162
Game, cold storage of.... 66, 72
definition of.... 165
destruction of, due to white men.... 38
food value of....63, 96, 119
heavy slaughter of.... 95
hunting of, by proxy.... 67
importance of conservation of.... 4
killing of, for food.... 55
market-hunting of.... 96
principles for conservation of.... 65
protection of.... 123
sale of....18, 64, 66, 69
shipment of.... 123
supply of.... 66
utilization of.... 60
Game Act, British Columbia.... 130
Game Act, Prince Edward Island.... 152
Game Commission, Nova Scotia.... 59
Game Commission of California.... 109
Game Conservation Board, British Columbia..2, 100, 101, 102, 116, 129, 140, 152
Game laws, enforcement of.... 144
Game Protection Branch, Alta.... 52, 154
Game sanctuaries....13, 46, 50, 57, 78, 143, 144
Game wardens.... 66
qualifications of.... 49
United States....111, 112
Gannet....159, 162
Geese, wild....120, 158, 161, 166
at Kingsville, Ont.... 88
harassing of.... 76
in Prince Edward Island.... 119
migration of.... 104
permit to keep, in captivity.... 116
protection of, in Nova Scotia.... 108
shooting of.... 87
snow.... 67, 104
spring shooting of.... 102
wintering of.... 78, 107
Genesis, reference to.... 82
Geological Survey.... 2, 11
Georgia, strait of.... 36
Georgian bay.... 92
Goat, mountain.... 47, 165
Godwit....158, 162
Goose, Canada....44, 89, 90, 110, 116, 147
Goose, domestic.... 116
Gordon, W.... 138
Gouin, Sir Lomer.... 7
Grand Trunk Pacific Ry.... 53
Grant, Sir James.... 2, 156
Grebe....159, 162
Greenland, fur trade of.... 13
Grenfell, Dr. W. T.... 6
Grey county, Ont.... 92

PAGE

Grizzly bear 132
Grosbeak 158, 162
Grouse 92, 166
Gruidae 158, 161
Guillemot 159, 162
Gull 159, 162
Gun licenses, resolution *re* 40

HALL, W. C. J 2, 39, 50
Harkin, J. B 2, 45, 46, 51, 99, 115, 118, 127
Harris, Samuel 2, 44, 72, 132, 133, 141, 145, 147, 150, 155
Hawk 94
Hay river, Alta 47
Hebrews, reference to 86
'Helen,' life history of 84
Heron 79, 159, 162
Herschel island, Yukon 167
Hewitt, Dr. C. Gordon 2, 6, 8, 16, 31, 39, 41, 70, 92, 99, 102, 105, 113, 114, 115, 116, 117, 118, 119, 128, 129, 139, 149, 150, 152, 153, 154
Hill, Dr. E. A 2
Hornaday, Dr. W. T 2, 5, 59, 60, 120, 130
Hose, R. E 2, 17, 116, 117, 129, 140
Hudson bay 4
  migration of geese to 86
Hudson's Bay Company 86, 138
Humming bird 158, 162
Hunting, fees for 167
Hunting leases 122

INDIAN Act 20
Indian Affairs, Dept. of 2, 11, 14, 32, 54, 135, 136
  fur statistics of 138
Indian river, Grey county, Ont 92
Indians 60, 143
  alleged wanton slaughter by 22
  application of provincial laws to 20
  food supplies of 21, 27
  illegal hunting by 146
  of Alberta 54
  of New Brunswick 33
  privileges of 162, 166
  relation of, to wild life conservation 5, 19
  respect game sanctuaries 48
  return tags on wild geese 86
  slaughter of beaver by 29, 34
  slaughter of moose by 24
  treaties with 20
Industrial census 136
Insectivorous birds 76
Interior, Dept. of the 2, 3, 4, 11
Interior, Minister of the 5, 11, 159, 165

JAEGER 159, 162
James bay, migration of geese to 86
James river, Alta 47
Japan 120
Jasper park 48, 50
Job, reference to 83
Juneau (Alaska) Fish and Game Club 68

KENTUCKY, migration of ducks to 86
Kinglet 158, 162

PAGE
Kingsville, Ont....83, 84, 86
Knight, J. A....1, 34, 40, 59, 107, 128, 139
Knot....158, 162

LACEY Act....111
Lake St. John region, Quebec....124
Lands and Forests Dept., Quebec....122
Lansing, Hon. Robert....161, 164
Lamont, Alta....51
Last Mountain lake, Sask....103
La Tuque, Que., moose meat consumed at....36
Laurentides National park, Que....50
Lawton, Benjamin....2, 51, 59, 72, 102, 114, 115, 131, 148, 154
Laurier, Lady....156
Laurier, Sir Wilfrid....3, 6, 156
Leases, fishing and hunting....122
Lemieux, E. E....2, 37, 72
Licenses, authority to issue....173
books of....141, 142
family the unit for....67
for taking deer, Ontario....141, 142
fur traders'....123, 129, 140
gun....40
hunting....66, 98, 112
procuring of....145
proposed issue by proxy....67
Lillooet district, B. C., hunting in....31, 36
Limicolae....158, 162
Little Rock, Arkansas....79
Lloyd, H....115, 116
London, Eng....154, 157
Long Island, N. Y....86
Loon....159, 162
Los Angeles, Cal....109
Louise, lake, Alta....47
Louisiana....86, 104
bird refuges in....78

MACKAY, J. F....1
Mackenzie basin....4, 71
McMurray, Alta....138
Macoun, J. M....2, 36, 41
Mallards, hatched by hen....84
Manitoba....125, 132, 156, 165
migration of ducks to....86
protection of migratory birds in....103, 104
Maritime Provinces....151, 162
resolution *re* game preserves in....57
Marsh, Edith L....92
Marten....124, 166
Martin....83, 158, 162
Maryland, migration of geese to....86
McCool, C. A....1
McDiarmid, Hon. F. G....91, 147, 148
McLean, Senator....111
Meadow lark....158, 162
Medicine Hat, Alta....53, 55
Meeting lake, Alta....25
Mellon, E....2, 127, 128
Meighen, Hon. Arthur....1, 2, 3, 6, 105
Mercier, Hon. Honoré....121, 139
Merganser....106, 110, 117, 118
Mexican bandits, killing of game by....95

PAGE

Mexico 98
wintering of wild fowl in 78
Michigan 110
Migratory Bird Act, original United States 81
Migratory birds 64
in Nova Scotia 35
prohibition of sale of 77
protection of 11
Migratory Birds Convention 2, 4, 5, 11, 12, 74, 99, 100, 101, 103, 117, 119, 142
text of 161
Migratory Birds Convention Act, The 99, 101, 102, 113, 115
text of 158
Migratory Bird Treaty (See "Migratory Birds Convention").
Migratory Bird Treaty Act (U. S.) 75, 80, 98, 108, 109, 110, 111
attitude of State governments to 74
constitutionality of 79
Milliners, prosecution of 79
Miner, Jack 2, 28, 37, 44, 45, 58, 81, 82, 90, 141, 147, 148, 149
government grant to 91
Miner, Jasper 84
Mines, Dept. of 11
Mink 124, 166
Minnesota 76
Mississippi river 86
Mississippi valley 78
Mitchell bay, lake St. Clair 84
Mitchell, R. S. 2
Montreal, Que 125
Moose 52, 67, 97, 165
increasing in New Brunswick 31
infuriated 132
in Laurentides National park 50
in Nova Scotia 35
sale of 63
slaughter of 22, 30
Mountain goat 52
Mountain sheep 52, 67, 97
sale of 63
Mule deer 52
Murray, Dr. Howard 1, 40, 58, 59, 81, 90, 94, 99, 108, 118, 119, 121, 128, 131, 133, 157
Murre 159, 162
Musk-ox 166
Muskrat 124, 129, 166

NATIONAL conference on the Conservation of Game 101, 148
National Wild Life Conservation Association 150
Nelson, E. W. 2, 5, 73, 74, 98, 108, 118
Nevada, nesting of geese in 76
New Brunswick 125, 153
beaver in 33
game preserve in 57, 58
moose in 31, 40
protection of migratory birds in 106, 107
resolution *re* Dominion park in 59
sale of game prohibited in 10, 70
New Brunswick Forest Act 17
New Brunswick Guides Association 70, 71
Newfoundland 165
New Jersey 130
migration of geese to 86
New York, N. Y 70, 79

PAGE

New York state 125
fur-farming in 98
New York State Conservation Commission 61
New York Zoological park 2, 59, 60
Nighthawk 158, 162
North America, game situation in 96
North Carolina, migration of geese to 86
North Dakota 76
North End park 47
Northern Trading Co 138
North Pacific ocean 120
North Shore, Que 124
Northwest Game Act 2, 4, 12, 14, 41, 127, 129
text of 165
Northwest Territories 165
fur trade in 13
game protection in the 11, 12
Nova Scotia 110, 115
deer in 40
fur statistics of 137, 139
game law of 67
increase of game in 35
proposed game preserve in 58
prosperity of 153
protection of migratory birds in 107
resolutions *re* game preserve in 57, 59
wild geese in 59
Nova Scotia Inland Game and Fishery Protection Association 34
Nuthatch 158, 162

OHIO 84
migration of ducks to 86
Olds, Prof 148
Omineca district, B. C 70
Ontario 125, 126, 165
game protection in 142
protection of migratory birds in 104
Ontario Agricultural College 93
Ontario Government grant to Mr. Miner 91, 147
Oriole 158, 162
Ornithologists 116
Otter 125, 129, 166
Ottawa, Ont 101, 113, 116, 117, 148, 155
Our Vanishing Wild Life 59
Owl 94
Oyster catcher 158, 162

PACIFIC current 120
Panther river, Alta 47
Parent, Hon. Mr 105
Partridge 166
Paterson, N. J 70
Peace River district 38
Peasemarsh farm, Grey county, Ont 92, 93
Pelee island, Ont 86
Pelee, point, Ont 44
Pelicans, white 166
Pennsylvania 130
Penniac, N. B 70
Permits, emergency 130, 114, 163
propagation 116, 163
scientific 114, 115, 117, 163, 166
Petawawa Camp Fish and Game Club 2, 37

PAGE

Petrel....159, 162
Phalarope....158, 162
Pheasants, English....148
Pigeon....158, 162
band-tailed....162
passenger....95
Plover....158, 162
Poaching....125
Poison, prohibition of....142, 167
'Polly,' life history of....84, 85
Porcupines, damage by....57
Portland canal, B. C. and U. S....120
Post Office Dept....139, 140
Prairie chicken....166
Pratt, George D....61
Predatory animals....10
Preley, Carl A....95
Prince, Dr. G. H....1
Prince Albert, Sask., slaughter of elk near....23
Prince George, B.C....140
district, B. C....70
Prince Edward Island....118, 119, 131, 152, 154
Province of Quebec Society for the Protection of Birds....2
Provincial co-operation *re* migratory birds....99
Provincial fur statistics....137
Provincial jurisdiction over game....99, 100, 101, 105, 114, 115, 116, 117, 118, 151, 152
Ptarmigan....166
Puffin....159, 162
Pump shotguns....52, 130, 131

QUAIL, conservation of....45
Quebec, province of....118, 121, 122, 125, 127, 128, 132, 165
depredations by Indians in....30
fur production of....137, 153
protection of migratory birds in....105
Quebec city....125
Queen Charlotte islands, B. C....116
Quill lakes, Sask....103

RAIL....158, 162
Rallidae....158, 162
Rapsey, Geo. H....2, 32, 104, 128, 140
Red fox....129
Red River district, Man....104
Reindeer, importation of....6
Reserves, hunting....122
Resolution, fort, N. W. T....64
Resolutions, *re* automatic guns....130
re cold storage of game....72
re control of fur trade....126
re death of Sir Wilfrid Laurier....156
re Dominion parks in New Brunswick and Nova Scotia....59
re fur statistics....138
re game preserves in New Brunswick and Nova Scotia....57
re grant to Jack Miner....147
re gun licenses....40
re Indians....146
re local game associations....145
re report of Essex County Wild Life Conservation Association....145
re sale of game....69
Revillon Frères, Montreal....2, 138
Riggs, Thomas....63

PAGE

Robin, American....83, 93, 158, 162
Rocky Mountains park....46, 50, 51
Rocky Mountain sheep, slaughter of....30
Rod and Gun in Canada....2
Roosevelt, Col. Theodore....3, 132, 156
Rotary Club, London, Ont....88
Royal Northwest Mounted Police....146, 167
Royalties on furs....123, 126, 129
Rundle, mount, Alta....47
Rupert's Land....165
Russia, game preserves ruined in....95
Rutherford, Dr., of Chatham, Ont....84

SACRAMENTO, Cal....109
Saguenay region....124
St. Clair, lake....84
St. Louis, Mo....154
St. Michaels, Alaska....62
Salmon, injured by wild fowl....107, 117, 118
Sanctuaries, wild life....13, 46, 57, 78, 143
  boundaries of....144
  suggested increase of....50
Sandpiper....158, 162
San Francisco, Cal....109
Saskatchewan....131, 132, 146, 165
  difficulties with Indians in....21
  migration of ducks to....86
  migratory birds of....103
  prohibition of sale of game in....10
Sault Ste. Marie, Ont....86
Sawback district, Alta....47
Scoter....162
Scott, Duncan C....2, 19, 28, 32
Seton, Thompson....4
Seymour, A. O....2
Shearwater....159, 162
Sheep, mountain....47, 165
Sheep, domestic....53
Sheffield, Eng....157
Sheldon, Charles....2
Sheldrake....106, 107
Shrike....158, 162
Silver fox....129
Sioux Indians....38
'Sir John Moore,' story of....89
Sitka, Alaska....120
Skins, stamping of....123, 124
Skins, unprime....127, 128
Smith, Hon. E. A....1, 17, 32, 39, 57, 59, 117
Smith, Corp. John R....85, 106
Snipe....158, 162
Society for the Protection of Birds (Que.)....155
Sora....158, 162
South Dakota....76
Sparrow, European....83, 94
Sportsmen, part played in war by....52, 96
Spring-Rice, Sir Cecil A....161, 164
Spring shooting....119, 120
Squirrel, red....94
Statistics, Bureau of....134, 138
State control of game....112
Statistics, fur....134
Stewart, Mack....85

PAGE
Stilt....158, 162
Sudbury, Ont....28, 43
Sudbury District Game and Fish Protective Association....2
Sulzer bill....63
Supreme Court of the United States....80
Surf bird....158, 162
'Susan,' life history of....84, 85
Swallow....83, 158, 162
Swan, wild....103, 148, 158, 161, 162, 166
trumpeter....77
Swift....158, 162
Syracuse, N. Y....70

TANAGER....158, 162
Taverner, P. A....2
Taylor, W. J....2
Temiscouata district, Que., depredations by Indians in....30
Tennessee....85
migration of ducks to....86
Tern....159, 162
Texas....78
Thompson, Lieut.-Col. A....2, 121, 119, 153
Thornbury, Ont....92
Thrush....158, 162
Titmice....158, 162
Trap-lines....144
Trapping, fees for....167
Turnstone....158, 162
Tye, W. F....1, 38, 39, 58
Typhoid, carried by flies....83
Tyrrell, J. B....4

UNGAVA, depletion of game in....5
United States....2, 3, 63, 64, 65, 66, 69, 73, 74, 77, 79, 96, 97, 98, 107, 108, 110, 111, 118, 119, 125, 143, 154, 155, 162, 163
delegates from the....2, 3
Dept. of Agriculture....148
protection of migratory birds in the....74, 158, 161
United States Forest Service....112
Unity, Sask., complaint from....24
Unprime skins....127, 128

VALDEZ, Alaska....120
Vancouver, B. C....101, 138
Vancouver Angling and Game Assn....2, 100, 101
Vancouver Game Club....2
Vancouver Gun Club, Ltd....102
Vermin, killing of....97, 98
Victoria, B. C....100
Vireo....158, 162

WAINWRIGHT, Alta....13, 47, 51
Wapiti....166
War, death casualties of the....95
Warbler....158, 162
Wardens, game....99, 106, 144, 165
Wardens, sanctuary....144
Washington, D. C....76, 109, 158, 161, 163, 164
prosecution of game-sellers in....80
Washington, game protection in state of....113
Waterton Lakes park, Alta....50
Waxwing....158, 162
Weasel....94

PAGE
Whippoorwill....158, 162
White, James....2, 70, 91, 104, 115, 128, 147, 148, 155
White river.... 97
White-tailed deer.... 52
Wilson, Dr. C. W.... 2, 71
Winnipeg, lake.... 104
Witchekan lake.... 25
Witchekan Lake Indians.... 28
Willet....158, 162
Williamson, F. H....2, 45, 58, 115
Wolves, depredation by.... 37, 142
Woodcock....158, 162
Woodpecker....93, 158, 162
Wren....158, 162

YELLOWLEG....158, 162
Yellowstone park.... 112
Yukon territory....119, 120, 121, 153, 155, 165
climate of.... 120
fur production of.... 153
protection of game in.... 11
shipment of furs from.... 154
Yukon river.... 62, 120

SOUTHAM BUSINESS PUBLICATIONS LIMITED
LIBRARY